THE IRON TRADE REVIEW

Volume LII CLEVELAND, MAY 15, 1913 Number 20

Easier Conditions Prevail in Finished Lines

And Pig Iron Languishes—Price Concessions Fail to Bring Out New Business—Southern Situation Weak

Continued mill activity, with new buying at low ebb, increasing concessions in prices and some restlessness of labor, especially in foundries, characterize the market. In finished materials, especially plates and shapes, prices are generally settling to those which the Steel Corporation has been asking for many months. Independent companies find it impossible to obtain premiums which were enjoyed until recently. Dissatisfaction of workingmen, coming at a time when many employers are fearing that they will be compelled to reduce the number of their employes, is unexpected and is attributed in some quarters to the fact that workingmen, feeling the strain of long activity, are willing to quit on slight pretext.

Pig Iron

Although pig iron is very dull, statistical conditions are favorable. There has been some increase in stocks in the south, but the Eastern Pig Iron Association's report for April shows that stocks which were already light remained about stationary, while there was a substantial increase in unfilled orders. As eastern merchant furnaces are shipping about 125,000 tons monthly, the bookings are by no means small. The Virginia Iron, Coal & Coke Co. is shipping at the rate of about 25,000 tons per month, and has cut down to about 60,000 tons its stock on hand, which was very large a year ago. The American Steel & Wire Co. has purchased 6,000 tons of low phosphorus iron from a New York state furnace for delivery during the last half of the year at Worcester, Mass. Leading malleable makers are apparently preparing to sound the market on pig iron in the east, but the large consumers of malleable and foundry grades are for the most part showing no interest in the market. As few of them have bought for their requirements after July 1, a buying movement is expected at an early date. Southern pig iron is very weak and it seems likely that $11.50, Birmingham, will soon be the prevailing price for No. 2. Reports of foundry iron selling at as low as $14.50 valley, are heard.

Ferro Manganese

Consumers of ferro-manganese do not seem to be alarmed about being compelled to pay the high duty proposed by the Underwood tariff bill. It is generally believed that the Senate will reduce this tariff. Ferro-manganese is weaker and sales have been made in Philadelphia of carloads at $59, seaboard.

Plates

Eastern plate makers state that the number of sales they are receiving is still large, but the aggregate tonnage is reduced and premiums are vanishing. The contract for the steel for the new freighter which is to be built by the American Shipbuilding Co. for a Canadian interest has not been awarded, but it will go to an American mill. The boat will be 625 feet, the longest vessel on the lakes.

Shapes

Although for prompt shipment higher figures are occasionally obtained, 1.45c, Pittsburgh, is now the usual quotation on structural material, and some mills are giving very prompt shipment. Keen competition has developed among fabricators in eastern territory. The United States Steel Products Co. has taken an order for 4,000 tons of structural material for a refrigerating plant at Rio Janeiro. Post & McCord have a contract for 1,200 tons for a loft at Madison avenue and Fifty-third street, New York. Structural contracts for the week at Chicago amounted to about 10,000 tons, including 7,000 tons for the Stevens building, that city.

Railroad Buying

Railroads are placing orders very slowly at the present time and it is estimated that inquiries for cars now pending amount to only about 10,000. The Lackawanna is in the market for 10 or 12 bridges. A number of important orders for locomotives have been placed. Car shops are filled to capacity for fully three months, and some will be able to keep busy for six months on present orders. Foreign inquiries include a fair tonnage of bridge work for railroads in Manila and Japan.

Coke

The Bethlehem Steel Co.'s purchase of 20,000 tons of furnace coke for last half delivery has apparently had little effect on the market, which is only fairly strong. Owing to the low price of pig iron, furnaces are not disposed to contract for coke at present prices.

Old Material

Prices of scrap continue to decline and are getting so low in some centers that further decline does not seem probable. In the Chicago district, it is believed that very little of the scrap offered last week by the railroads was sold, as both consumers and dealers were reluctant to bid.

Competition for Indian Steel Work Threatened

Invasion of Pacific Coast Market by Indian Pig Iron Imminent—Interesting Data Regarding Export Trade Presented at Steel Corporation Hearing

President James A. Farrell offered in evidence an exceedingly interesting exhibit at the Tuesday hearing of the United States Steel Corporation dissolution suit, which showed that from 1904 to 1912 the Steel Corporation's gross tonnage output increased 123.9 per cent, while the selling value increased 181.7 per cent for the entire tonnage, or an increase in the value of the aver- gross tons of 25.8 per cent. Mr. Farrell explained that this increase in the average price per ton was due to the sale of an increased tonnage of highly-finished products and a decline in the tonnage of semi-finished lines. The exhibit also showed that the Steel Corporation's export shipments for 1912 aggregated $76,812,253. This, President Farrell explained, was f. o. b. mills value, whereas the estimate of $91,000,000 to $92,000,000 made the previous day and contained in the report of Monday's hearing at New York, published elsewhere in this issue, was the invoice value of export shipments; that is, f. o. b. value plus freight and insurance.

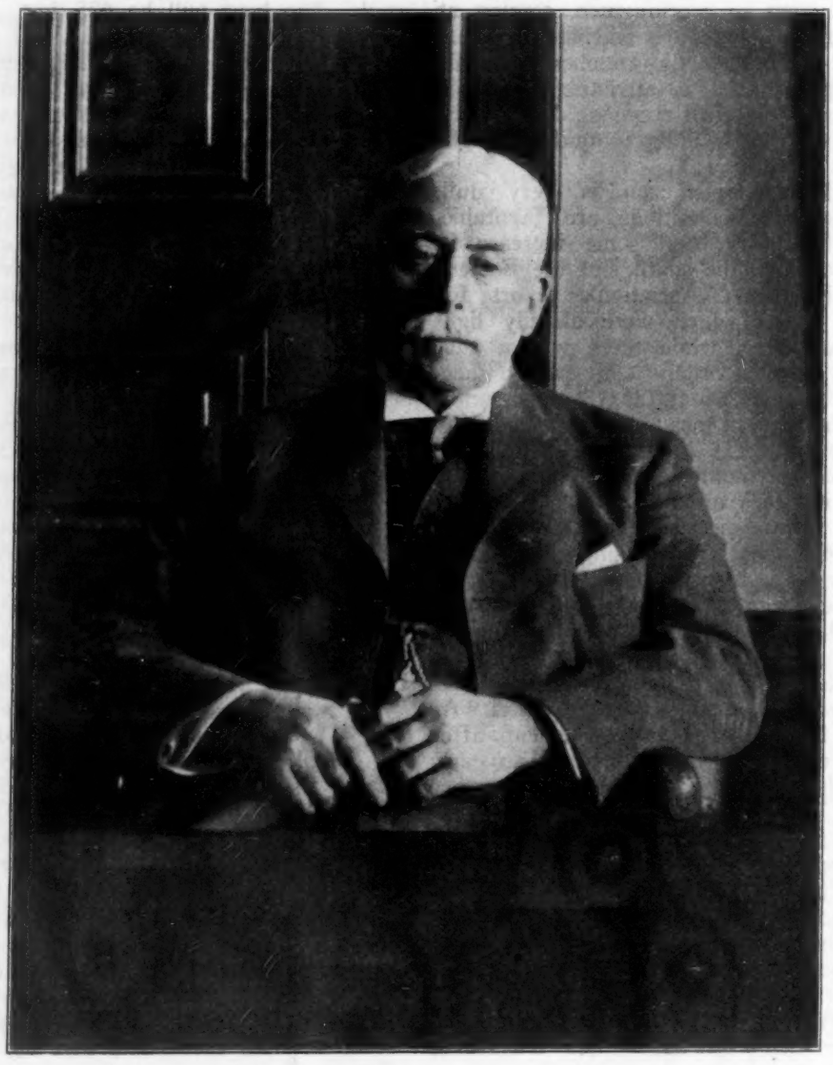
Although the exhibits submitted showed an increase of 87 per cent in domestic business for 1904 to 1912, and an increase in the selling value of 65.2 per cent, the latter showed a decline in the invoice value per gross ton on shipments to domestic consumers of 11.6 per cent. President Farrell explained that the domestic market has steadily declined and shows an average reduction of about $8 a ton, as compared with the prices prevailing in 1901.

Mr. Farrell's testimony regarding the growth of the open-hearth and the decline of the Bessemer processes, respectively, proved highly interesting. At the present time, he stated that approximately 1,500,000 tons of the Steel Corporation's annual steel-making capacity is obsolete because of the change from the Bessemer to the open-hearth process. He added, "We shall probably develop an evolution from the open-hearth to the electric steel-making process in a few years. We are making some electric steel at present." The Steel Corporation is operating only 30 per cent of its Bessemer capacity, and in 1912, approximately 45 per cent of the 17,500,000 tons of ingots produced by this corporation was Bessemer steel.

President Farrell testified that other manufacturers of cotton ties have exhibited no particular desire to roll them this year, owing to the low prices prevailing. For this reason, it has devolved upon the Steel Corporation to produce about 1,900,000 bundles of cotton ties to bale this season's cotton crop. The ties are sold at about 55 cents a bundle, equal to about 1½ cents a pound, and he explained that the reason the Steel Corporation's competitors show no anxiety to make cotton ties is because the steel contained in the hoop mill products can be sold at about $1.25 a bundle. It is estimated that the cotton crop this year will amount to about 16,000,000 bales, valued at $750,000,000, and yet it will require only $2,000,000 worth of ties to bale the entire yield.

President Farrell corrected his statement regarding the growth of the export business of the Steel Corporation, having testified on the day previous that it amounted to 290,000 tons in 1903. This he stated totaled 270,000 tons in 1902.

He explained that the United States Steel Products Co. handles most of the foreign trade of the subsidiaries of the Steel Corporation, but the armor plate business is handled directly by the Carnegie Steel Co. Shipments of rails from the plant of the Tennessee Coal, Iron & Railroad Co. have been made to the Argentine Republic, Brazil, and Central America. Comparing the wages paid in European steel works, President Farrell testified that these are 37 to 38 per cent of the wages paid in this country, and in addition, the cost of inland transportation is lower. In Germany, the water



PRESIDENT FARRELL ON THE STAND

transportation, a distance of 300 miles, from the Westphalia district to Antwerp is only 60 cents per gross ton, compared with a rail rate of $2.05 from Pittsburgh to New York, with the exception of a special rate on rails, which is $1.75 per gross ton.

That the new iron and steel plant in Calcutta, India, will soon invade the Pacific coast market with its products is indicated by Mr. Farrell's testimony. He stated that the cost of producing pig iron in that country is about $5.49 a ton, and that the wages paid to the workmen are about 3 cents a day. A cargo of pig iron now is on its way from Calcutta to San Francisco, the sailing rate varying from $5 to $6.50 per ton. The price of pig iron on the Pacific coast is $21.50, about $10 above the cost of the Indian pig iron laid down in that territory. Other foreign competition referred to is that of Chinese iron and steel works, and in the future, the new plant that is being built in Australia.

Of the manufactured iron and steel products exported from this country, President Farrell testified that the Steel Corporation furnishes approximately 90 per cent. He added that 60 per cent of the iron and steel products of Germany are exported, and 65 per cent of the output of English mills.

Steel and Wire Products

President Farrell submitted figures covering the total sales of the Americain Steel & Wire Co. from 1900 to 1911. They show that this company furnished 40 per cent of the bright and annealed wire sold in this country in the earlier year and 30 per cent in the later year. The output of wire nails decreased from 60 to 42 per cent of the country's production, and in 1911, this product constituted 25 per cent of the company's total output. The statement showed that the Steel & Wire company's percentage of business in most of its lines in this country has steadily diminished. The export trade of the American Steel & Wire Co. is large and amounts to 360,000 tons annually at present. Asked whether there are many articles that are exclusively suitable for the foreign trade, President Farrell testified that 18,000 different articles are suitable for sale in foreign markets, many of them being manufactured exclusively for foreign consumption. In 1902, the American Steel & Wire Co. did a larger foreign business in proportion to its total production than any of the other companies that became subsidiaries of the Steel Corporation. Since the organization of the National Tube Co., President Farrell stated that the plants which were not absorbed since have increased greatly in capacity.

VIGOROUS ATTACK

Made by Railroads on Steel Companies in Rate Case.

Washington, May 14. (By wire.)—At the conclusion of a conference this morning between representatives of 52 eastern railroads and the Interstate Commerce Commissioners, it was announced that the commission had taken under advisement the petition for rehearing submitted by the roads asking for an advance of 5 per cent.

It is sought to re-open the old eastern advance case No. 46, decided adversely to railroads about four years ago. The roads want to avoid at present filing tariffs costing about $400,000, which would prove a useless expense if the reopening is not allowed.

The roads set up the plea of big expenditures made and proposed. Their committee consisted of George F. Brownell, vice president and general solicitor of the Erie; George S. Patterson, general counsel of the Pennsylvania; Clyde Brown, general solicitor of the New York Central lines, and Hugh Bond, general counsel of the Baltimore & Ohio. The Pennsylvania, Baltimore & Ohio and Erie will cite cases instituted by the Youngstown Sheet & Tube Co. and other independents of the valleys attacking the ore and coal and coke rates and attempt to show that an increase instead of decrease should be made.

The railway briefs charge the steel companies with "dog in the manger tactics". They declare that if any reduction is made in the present ore freight rate of 50 cents a ton from Lake Erie ports to blast furnaces it will work havoc with revenues of the railroads in Ohio and force them to abandon proposed improvements.

Instead of reducing the ore and coal rates as the steel companies have asked, the railroad briefs argue, the general fabric of rates in the east should be increased.

The Coke Situation

Pittsburgh, May 14. (By wire.)—The Bethlehem Steel Co.'s purchase of about 20,000 tons of prompt furnace coke at $2.25, ovens, has led shippers to believe that the market is strong at that figure. It is understood, however, that some dealers have sold fuel at considerably less than $2.25. Negotiations for second half requirements have not yet been opened by blast furnace interests.

CHINESE PIG IRON

Will Not Be Shipped to the United States—Will Need American Rails.

During the past year, there has been much discussion as to the probability of Chinese pig iron being imported into this country, particularly on the Pacific coast. It has been persistently reported that the Hanyang Iron & Steel Works had been destroyed during the revolution. In order to obtain the facts, inquiry was made by letter addressed to Hon. Roger S. Greene, American consul general, at Hankow, who replies as follows, under date of April 2:

"In reply to your letter of Feb. 1, 1913, I have to state that the Hanyang Iron & Steel Works were not destroyed during the revolution, though they were shut down so long that considerable work was necessary to put them in running order. They are now in operation, but are not yet producing as much as they did at one time. The price of local pig iron here is purely nominal, as there is no surplus available for sale in commercial quantities, practically the whole output being required to fill contracts with Japanese steel works. So far as I can see, there is no probability of pig iron being shipped from this point to the United States in the near future. A shipment of American rails has recently been received here for the Canton-Hankow railway and when the work of construction is started in earnest on that line and on other projected roads in central China, it seems likely that the Hanyang Iron Works will be quite unable to supply the demand and that importations of foreign rails will be necessary."

Pig Iron Tending Downward

Pittsburgh, May 14. (By wire.)—Indications are that lower prices will come out shortly on several pig iron grades. Talk of foundry selling at $14.75 and as low as $14.50, valley, is heard, although it is impossible to confirm such reports. Report from Cincinnati that southern No. 2 is selling at $11.75, Birmingham, was confirmed here this morning by one in close touch with the southern pig iron situation who says that considerable southern foundry has sold at that figure at St. Louis.

Carl H. Hanna has been transferred from the Detroit office of M. A. Hanna & Co. to the Cleveland office, and has been succeeded at Detroit by A. A. Murfey, who has been connected with the Cleveland office for a number of years.

Pittsburgh Hopes to See Big Buying Movement

In Pig Iron at Early Date, But Present Market is Dull—Bethlehem Buys 20,000 Tons of Coke

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg.,
Pittsburgh, May 13.

Manufacturers are gradually getting closer to consumers as specifications continue to fall off. Mills have enough actual orders on their books, however, to assure maximum operation through the third quarter of the year and appear to be more optimistic than a week ago, despite the fact that new orders have not improved in volume. Production has not been decreased and indications are that it will continue at its present rate until the late fall.

Although smaller lines, such as nuts, bolts and rivets, are somewhat soft, the more important products, including plates, shapes and bars, are being well maintained in price. Bessemer and open-hearth sheet bars are commanding $27.50, mill, for last half delivery and rather fancy prices continue to be paid for prompt steel. The pig iron market is quiet, but shows indications of activity.

Connellsville coke is holding its own in good shape. Unless pig iron prices advance, it is not at all improbable that several merchant furnaces will have to blow out, especially if blast furnace fuel does not decline. The scrap market is weak and no demand is being experienced.

Pig Iron.—With the second half of the year only six weeks distant and with only a few consumers under cover for that period, dealers expect to witness a heavy buying movement the next 30 days. Better inquiry is being experienced for steel-making iron, although none of the heaviest consumers is in the market. Frequent expressions are heard that quotations will decline when buying begins and will advance shortly after initial transactions are closed.

Foundry and malleable are not selling above $15, valley, and rumors are heard that the former grade has been obtained at less than that figure. Gray forge has dropped to $14.50. Bessemer and basic are nominally quoted at $17 and $15.50, valley, respectively. The Westinghouse Electric & Mfg. Co. is expected to close bids this week for second half foundry requirements for shops at Cleveland and Pittsburgh and considerable interest is being taken in this transaction.

The Perry furnace at Erie, Pa., of Pickands, Mather & Co., Cleveland, will not be blown out for relining and No. 4 stack of the Jones & Laughlin Co.'s Eliza group is out for repairs. The American Steel & Wire Co. has blown in its second furnace at the Schoenberger works, Pittsburgh.

Ferro-Alloys. — Ferro-manganese is selling at $60.50 and less, for prompt delivery, and it is not at all improbable that material could be obtained at less than $60, seaboard, if an attractive tonnage were involved. Fifty per cent ferro-silicon, which is in good demand, continues firm at $75, Pittsburgh. Yesterday the freight rate on ferro-manganese and other ferro-alloys was advanced from $2 to $2.16, from Baltimore to Pittsburgh. The advanced freight rate together with the proposed duty has caused independent consumers to complain.

Plates.—Wide ranges in quotations are rapidly disappearing and it is believed that all mills would accept the 1.45c quotation for forward delivery. Prompt material can be had from 1.50c to 1.60c as against the 1.90c quotation prevailing six weeks ago. Specifications against contracts are coming in in good volume, but are not so heavy as they were a month ago, and shipments are gradually improving. The Grand Trunk Pacific will buy 490 locomotives and 30,000 freight cars of miscellaneous types, according to its program covering the next three years. The Riter-Conley Mfg. Co. has a contract for plate work for a 600-ton metal mixer for the Mesta Machine Co., Pittsburgh, and will soon commence on a contract for the Electric Carbon Co. for four storage tanks. The government has not yet awarded the contract for two colliers involving about 7,000 tons. The Jones & Laughlin Steel Co. has taken an order for 200 tons of caisson plates in addition to the order last week, involving 1,400 tons.

Sheets. — Steel sheet products are stronger than a fortnight ago, recent sales indicate. Rather heavy tonnages of black sheets have sold at $2.35, and galvanized sheets have brought $3.50, the past week. Consumers in the eastern part of Ohio, where concessions appear to be the rule, have paid full prices recently. Production continues to be cut down because of insufficient sheet bar supplies. The American Sheet & Tin Plate Co. is operating 79 per cent of its sheet mill capacity.

Tin Plate.—The foreign tin plate market appears to be picking up and it will be more difficult for American consumers to obtain prompt material abroad. Mills in this district cannot promise tin plate for anything like prompt delivery. The tariff question is the subject of considerable discussion but leading manufacturers do not appear to be alarmed. The American Sheet & Tin Plate Co. is operating 86 per cent of its tin mills. Tin plate continues firm at $3.60 for base size tins.

Rails.—There has been fairly heavy new demand for steel rails, and it generally is believed that traction line interests soon will supplement tonnages placed earlier in the year. Light rails continue active. Domestic and foreign demand for rails and steel ties is especially good for this time of the year. Spikes have been selling at 1.80c and are fairly active. The base price of open-hearth steel rails is 1.34c per pound at the mill.

Billets and Sheet Bars.—Excitement has prevailed as a result of reports that material had sold at decidedly less than market quotations. A careful investigation shows that steel now is being obtained at considerably less than prices ruling since Feb. 6, although it has been imposible to confirm sales of open hearth sheet bars at $26.50, makers, mill. Cautious buyers have obtained Bessemer and open hearth sheet bars for second half delivery at $27.50 and $28, Pittsburgh and Youngstown, and some consumers contracting for second half needs were able to get small tonnages of second quarter steel at that range. These offers were made by mills with new capacity and the average consumer has had to pay $29 and above for prompt open hearth sheet bars.

Billets are obtainable at lower figures, but very few actual sales have been made. Basing figures on actual transactions, we quote for prompt delivery, Bessemer billets $28, open hearth billets, $28.50, Bessemer sheet bars, $28.50, to $29, open hearth sheet bars, $29, maker's mill. Bessemer and open-hearth sheet bars for forward delivery are quoted at $27.50 to $28. Many contracts for fu-

ture shipment are subject to the future decline in prices.

Hoops and Bands.—Specifications continue heavy, but new buying is quiet. Deliveries are steadily improving. Prices are firm on the basis of 1.60c for hoops and 1.40c for bands.

Iron and Steel Bars.—Deliveries are steadily improving, although mills are well booked up for practically all of the year. Specifications against contracts have been coming in in good volume and some makers state that specifying has been heavier this month than last. Iron bars, which are in good demand, are quoted at 1.70c to 1.80c. Cold rolled shafting remains unchanged in price.

Muck Bar.—Sales of muck bar are being made from $31 to $32, Pittsburgh. Eastern muck bar has been offered in this district at $30.

Bolts, Nuts and Rivets.—Prices on nuts, bolts and rivets have declined about $1 a ton and conditions in this market are similar to those prevailing in other centers where concessions first appeared. Structural rivets can be had from 2.15c to 2.20c and boiler rivets from 2.25c to 2.30c. Bolt and nut discounts can be shaded by 5 per cent.

Structural Shapes.—What has been said of the market for steel plates applies to that for structural shapes. The Jones & Laughlin Steel Co. has taken 400 tons for the Western Union building at Detroit, and the Riter-Conley Mfg. Co. has been awarded the steel for a pump house at Pearl Harbor, Hawaii, for the government.

Iron and Steel Pipe.—A large volume of orders for small tonnages continues to be placed with mills in this district. An order for 30 miles of 16-inch line pipe for southwestern shipment has been taken by the National Tube Co. Deliveries are much better and some mills are more actively soliciting business than they were two months ago.

Boiler Tubes.—Locomotive builders continue to specify heavily for boiler tubes. Shipments are somewhat improved and new orders have been light. No changes in prices are noted.

Wire.—Despite the fact that some manufacturers enjoyed a record-breaking month in April from the standpoint of shipments, exceedingly little new buying is being done and the $1.80 price for nails has not been well established. Specifications last week against contracts taken at lower figures were fairly heavy, but mills advise that new orders were light. Jobbers' needs are well provided.

Wire Rods.—Consumers have not yet recovered requirements for second half delivery, but are expected to figure in the market within a month. Wire rods are nominally quoted at $30, Pittsburgh.

Coke.—The Bethlehem Steel Co. on Monday bought about 20,000 tons of standard Connellsville coke at $2.25, ovens, for shipment the next three or four weeks. Shippers, who believe the sale involved prompt fuel, insist it is indicative of strength while those who consider the sale a contract one, argue that the market for forward shipment at last has been broken. No contracts extending through the third and fourth quarters have been made and we continue to quote contract furnace coke nominally at $2.50, ovens. The market for foundry fuel shows no new developments although shippers are having more difficulty obtaining $3.25 a ton at the ovens. The Connellsville *Courier* for the week ending May 3, says production was 403,069 tons, a decrease of 12,679 tons compared with the week before. Shipments aggregated 11,840 cars.

Old Material.—The entire market is in the dumps. Unusually heavy quantities of scrap are being offered and the market has fallen into the hands of buyers. Dealers have been unable to sell some grades at any price. Heavy melting steel is not above $14. Machine shop turnings have fallen below $8 and other grades are correspondingly weak. Softness is attributed to heavy offers on the part of railroads and small dealers and the refusal of consumers to buy for anything but immediate requirements.

Ore Rate Advances at Cleveland

On Cargoes to be Shipped from Marquette—American Steel Will Be Used in Building Canadian Freighter

Office of THE IRON TRADE REVIEW,
Penton Bldg.,
Cleveland, May 13.

Iron Ore.—E. N. Brietung & Co. have resold 50,000 tons of heavy ore which was originally sold to the New York State Steel Co., now in the hands of a receiver. The price obtained was not made public, but it is probable that a slight concession below the regular quotation on this grade was made. With this possible concession, it is believed that the cutting on ore prices is confined to Corrigan, McKinney & Co., who are understood to be offering ore at 25 cents reduction from the regular prices. The Lake Superior ore carrying rate advanced 5 cents on a block of 50,000 tons at Cleveland, Monday, for shipment from Marquette, making the rate from that port 45 cents, and options to move another block have been covered at the same figure. It is very unusual for the wild rate to advance so early in the year, and vessel men are rejoicing over the prospect for a favorable season. There is little wild tonnage on the market.

Pig Iron.—While there is still an optimistic sentiment in the Cleveland market, there is a dearth of orders and there are no definite prospects of a buying movement. The Perry furnace at Erie will be blown out within a few days for relining and repairs.

Coke.—The market continues very dull, the usual quotation being $2.25 for prompt furnace and $2.50 on contracts, while foundry is quoted at $3.25 to $3.50 for both prompt and contract.

Finished Materials.—Structural mills in eastern Pennsylvania are showing more anxiety to obtain business and extras for certain sizes are being lopped off. Little difficulty is now experienced in obtaining quotations of 1.50c, Pittsburgh, for fairly prompt delivery. The contract for the steel for the new 625-foot bulk freighter to be built by the American Shipbuilding Co., at Port Arthur, for Canadian interests, has not been awarded but in all probability it will go to an American company. Salesmen continue to report shading on black sheets as well as galvanized of $2 per ton, but sellers at the low prices are keeping their identity pretty well hidden. The demand for bar iron is slack. The usual quotation is 1.60c, Cleveland. Cleveland jobbers are still doing an active business.

Among the structural contracts pending are a building to be erected by the Osborn Engineering Co. for the National Carbon Co., in New Jersey, the May Co. building, on which it is expected plans will be ready next week, and a 10-story addition to the Hotel Euclid.

Old Material.—No improvement can be detected in the market. Prices are generally weak and sellers are accepting almost all propositions. Practically the only business being transacted is in the filling of old contracts. Heavy melting steel is quoted $11.75 to $12.25, nominally.

Chicago Consumers Pursue Waiting Policy

Improvement in Specifications Reported by Some Mills—
Sheets and Rivets Weak—Few Transactions in Pig Iron

Office of THE IRON TRADE REVIEW,
1521-23 Lytton Bldg.,
Chicago, May 13.

A better run of specifications during the past week is reported by some producers in this territory. Some new business is being taken but in most lines buyers continue to follow a waiting policy. That lower prices on finished lines will materialize is not to be expected, as present mill bookings are more than sufficient to carry producers through the mid-summer dullness and they realize that lower quotations would discourage large buying. Acordingly, no new weak spots in the market have developed, but conditions in commodities for which there is the least demand have not improved. The sheet market is still weak and even lower quotations are heard on structural rivets.

Pig Iron.—The pig iron market is bare of any authoritative inquiries at present, although almost every melter in this territory is willing to figure on last half requirements. In the past, the continual recurrence of lower quotations has convinced many buyers that the pursuit of a waiting policy is advisable at this time, particularly those who are supplied with iron into the third quarter. Market activity at present is confined to comparatively small lots for prompt shipment and many sales of this character have involved iron taken by local southern sellers on consignment. In many cases, buyers have been able to obtain low prices for exceptional iron in small lots due to the seller's necessity of avoiding demurrage charges. Although quotations under $12, Birmingham, have been rumored, nothing has occurred to make the market quotable on a lower basis. Conditions in northern iron are unchanged and local producers are more inclined to meet competition from Ohio stacks than from southern furnaces. For this reason foundry iron seems somewhat stronger than malleable. No quotations on No. 2 below $16.50, furnace, have been reported.

Merchant Bars. — Premiums for prompt delivery of this material are very much lower, but contract prices are being firmly maintained. One producer of bar iron in this territory reports greater specifications during the past week, but new business remains about the same. Prices on iron bars are still quotable at from 57½c to 62½c. In steel bars, the greater part of the agricultural business has been booked, but it is understood that the larger buyers have not closed.

Structural Material.—New business in structurals remains light, but specifications are fair. There seems to be no indication of higher prices for fabricated material, but contractors show no disposition to go below the present minimum. A total of 9,931 tons was involved in structural contracts placed during the week, the individual amounts being small with one exception. The American Bridge Co. has taken 7,000 tons for the Stevens building, Chicago, and 129 tons from the Duluth, South Shore & Atlantic Railway Co. for a single track viaduct at Keweenaw, Mich.

Other contracts are as follows: The Worden-Allen Co., 237 tons for a new shaft house at Swanzy, Mich., for the Cleveland-Cliffs Iron Co., and 230 tons for a coal-handling trestle at Milwaukee, for the National Brake & Electric Co.; the Minneapolis Steel & Machinery Co., 213 tons for a hydraulic power station of the Northern Mississippi River Power Co., Coon Creek Junction, Minn., and 220 tons for a power house of the Great Northern railway at Minneapolis; the Kenwood Bridge Co., 101 tons for the Fortieth street shops in Chicago of the Chicago & North Western Railway Co.; Christopher & Simpson, 125 tons from George Tower, for the Mercantile building, St. Louis; Paxton & Vierling, 320 tons from the United States Stock Yards, Omaha; Security Constructtion Co., 448 tons for the Trinity Methodist church, Los Angeles; the Hassel Iron Works, 150 tons for the Myron Stratton home, Colorado Springs, Colo.; Detroit Bridge Co., 300 tons for a baggage room at Detroit, for the Michigan Central railway. The Missouri, Oklahoma & Gulf Railway Co. has contracted for 194 tons of shapes for a new machine shop at Muskogee, Okla., and Hamilton county, Ill., for 130 tons for a bridge at Dale. The Crawford & McCrimmon Co. has let a contract for 129 tons for a machine shop at Brazil, Ind.

Rails and Track Fastenings.—Railroads are not active in this market at present, no new rail orders being noted and new business in track fastenings being negligible. The scarcity of the latter makes it difficult to quote the market accurately. Specifications for rails are being received in good volume, however, and western roads show no disposition to cancel any pending contracts. Prices remain firm.

Plates.—Car builders in this territory have taken no new orders of consequence during the past week and no inquiries are noted. Other plate consumers are specifying liberally, but are disposed to await further developments before placing new business. The demand for plates out of store is good and jobbers' prices are quite firm.

Bolts, Rivets and Nuts.—The market for structural rivets continues weak and reports of prices on a basis of 1.90c, Cleveland, are more persistent. Bolts and nuts are fairly active, and the offering of new business is liberal. Some consumers complain that they are having trouble with deliveries, although in most cases the latter can be obtained on new business in about six weeks.

Sheets.—There is no betterment in the demand for sheets and the weakness of the galvanized variety is emphasized by further reductions in the price of spelter. One of the mills in this territory bought a tonnage of the last named material at 5.40c, delivered, last week. Some of the smaller mills still seem to be disposed to go lower in price in order to take desirable tonnages.

Wire Products.—The spring demand for wire products in this territory has been somewhat in excess of last year, particularly from agricultural districts. Wire nails and fencing are strong and there is a noticeable increase in the demand for steel posts. Reports that contracts have been extended by some producers have not been confirmed. The continuance of good business in this material is largely dependent upon the development of good crops.

Merchant Pipe and Tubes.—The past week has not brought out any especial significance and business is still comparatively quiet. Makers, however, are still satisfied and look forward to an increasing demand.

Cast Iron Pipe.—The pipe market is very dull and while a fair number of specifications for small lots are being received, no tonnages of any consequence are in the market. Prices are unchanged at $28, Chicago, for 4-inch water pipe.

Old Material.—It is thought that a

negligible quantity of the scrap offered by railroads last week was sold, as both consumers and dealers are reluctant to bid on account of the certainty that almost any reasonable price will get business. Dealers are anxious to dispose of the stocks that they have on ahnd, but are unable to do so at present owing to the supply held by consumers. The one evidence of firmness in an otherwise weak market is afforded by the scarcity of iron car axles. Dealers having orders for these at prices somewhat above current quotations have been unable to fill them during the past week. The most noticeable declines have been on frogs, switches and guards, and on heavy melting steel, both items being 50c a ton lower.

Philadelphia Buyers Are Still Very Cautious

Pig Iron Conditions Statistically Sound—New Business in Finished Materials Comes Slowly—Molders Make Demands

Office of THE IRON TRADE REVIEW,
611 Bulletin Bldg.,
Philadelphia, May 13.

Forward business in both crude and finished materials continues to be initiated more slowly in the eastern Pennsylvania district. Consumers are holding their new buying largely to the covering of the requirements for work already in hand and seem very cautious when it comes to obligating themselves further for third and fourth quarters. Sheets remain very active. Notwithstanding a very dull and rather weak present market, statistical conditions in pig iron remain favorable. April reports covering the Eastern Pennsylvania-Virginia merchant furnaces show a further decline in stocks and some increase in unfilled orders. Molders in Philadelphia and vicinity have demanded an advance of 25 cents a day, effective May 15, and foundry operations may be affected. The scrap market is still drooping.

Pig Iron.—In the face of a continued dull and listless trading, the pig iron market shows a surprisingly good statistical position. Despite shipments last month which were little short of the maximum point, eastern Pennsylvania makers accumulated a substantial increase in booked orders. During the same period, stocks remained about stationary. The heavy tonnage of basic iron placed in the month showed up strongly in the final figures. In the Virginia district, a further marked decline in stocks was noted. Orders with makers there were of less volume. The leading Virginia maker continues to ship heavily and to reduce its once large stock. The net result of the month in both the eastern Pennsylvania and Virginia districts was an increase in orders and a decrease of stocks. While there are some reports that the level has been shaded, $17, Philadelphia and vicinity, for No. 2X, is the going market and is now commonly quoted among eastern Pennsylvania makers. This figure, however, represents the full market on competitive business. Virginia iron has settled to $14.50, furnace, for No. 2X, or $17.30, Philadelphia. Reported lower prices are evidently on other grades. Standard forge remains $15.75 to $16, delivered eastern Pennsylvania. The total sales made to two eastern Pennsylvania iron mills at this range, as reported last week, it develops, reached about 12,000 tons. There is little new buying in pipe iron which on northern grades runs about $15.50 to $15.75, delivered. One consumer is offering to buy a round tonnage of low grade southern iron, but at a price much below the market which continues about $11, Birmingham, or $15.20, delivered, for forge. There is little demand for steel making iron. A recent sale of 1,000 tons of prompt basic at $16.50, delivered eastern Pennsylvania, is reported. An eastern steel company has taken 500 tons of standard low phosphorus at $23.50, Philadelphia basis. Another buyer closed for several thousand tons of the same grade for New England delivery. A local buyer will probably close this week on 500 to 1,000 tons of early malleable.

A demand for an advance of 25 cents, effective May 15, has been made by the molders upon the shops in the city and vicinity and a situation of considerable bearing upon the mar- not taken final action upon the de- ket may develop. Employers have mand.

Iron and Steel Bars.—Specifications against steel bar contracts have slightly improved this week according to reports from some makers, but buyers still show some reluctance to specify freely against 1.40c, Pittsburgh, contracts, which are now in force. There is little new buying being done, though some large negotiations are under way. A Wilkesbarre consumer is still figuring with makers on 15,000 tons of axle bars. Prompt bars are still in good demand. Smaller mills are receiving 1.85c to 1.90c, Philadelphia, and local jobbers get 2.05c to 2.10c for city delivery. Bar iron buying is not so active, but the mills are in good circumstances on accumulated orders.

Plates.—New orders in plates are reported by some eastern Pennsylvania makers to be as numerous as ever, but the tonnage as stated last week is less and the tendency seems to be towards easier conditions. With the liberal tonnage already upon their books, the eastern mills still have about all the business they can handle and they are not catching up on deliveries very fast. There is not apparent, however, the willingness of buyers to pay premiums for prompt material which prevailed a few weeks ago. Despite occasional reports to the contrary, eastern mills are maintaining their price of 1.60c, Pittsburgh, for tank steel and one of them is still quoting, except to the larger buyers, a dollar extra on universals. No announcement has yet been made by the government as to the 5,000 tons of plates bid upon by makers for the two new colliers. The Jones & Laughlin Steel Co. has received about 300 tons additional for Panama delivery.

Structural Material.—Buyers with attractive lots to offer are now having no great difficulty to obtain a price of 1.45c, Pittsburgh, or 1.60c, Philadelphia, from the structural shape makers of eastern Pennsylvania. In fact, the market on quantities of any size seems to be settling to that point. Some of the eastern mills are now able to make very prompt shipments, though small shapes are still very much delayed. The prices ruling on small lots for very quick shipment are usually from 1.50c to 1.60c, Pittsburgh. Specifications against contracts with eastern mills are not so heavy, The Jones & Laughlin Steel Co. is the probably successful bidder on 1,800 tons of shapes for the government colliers Kanawha and Maumee. This maker and the United States Steel Products Co. both bid 1.45c,

Pittsburgh, but the former offered shorter delivery. An award on the South Penn Square office building, this city, 2,100 tons, is imminent. This award is reported to lie between the Jones & Laughlin Steel Co. and the Phoenix Bridge Co. A viaduct for the American Railways over the Four Pole river, in Kentucky, 400 tons, has been awarded. Bids have been asked for an addition to the Arcade building, this city, about 1,000 tons. The ground has been acquired for a large addition to the Ritz-Carlton hotel, this city.

Sheets.—Tonnage in sheets going to the Alan Wood Iron & Steel Co. is still heavy and buyers continue to press the capacity of this maker for deliveries. The demand for quick shipment from consumers is almost universal and new business is largely of this class. Contracting for forward deliveries is on a small scale, though some sales are being made for both the third and fourth quarters. The market is firm at 1.75c, Pittsburgh, or 1.90c, Philadelphia, for No. 10 gage blue annealed.

Semi-Finished Steel. — Prices are firmly maintained by eastern makers on billets for nearby delivery to this and adjoining districts as the mills have their output engaged for some months ahead. The market remains $29 to $30, delivered, on rerolling, and $35 to $36, delivered, on forging billets. On contracts for delivery in the third quarter, especially for shipment to distant points, makers indicate a willingness to accept about $1 less. There is a lively demand for early steel. An inquiry for 500 tons is pending in this district.

Old Material.—Prices for scrap materials still decline, but it is indicated that they are approaching a point where they promise to be very attractive to consumers and will stimulate the laying in of further stocks. At present, buyers show little confidence in the market because of its almost weekly declines and are not placing many orders. Heavy steel is now down to $12.50, delivered, several thousand tons having been sold at that level. The Washington navy yard received from a dealer $9.87, Washington, or about $11.80, delivered eastern Pennsylvania, on 250 tons of heavy steel. There was also sold to the same buyer by this yard 800 tons of turnings at $7, Washington, equivalent to $9, eastern Pennsylvania. The market seems to be flooded with borings and turnings, especially the latter. Buyers of No. 1 wrought are offering $15, delivered. Sales of steel axles at $18.25 and $18.50, delivered, are noted.

More Concessions on Southern Pig Iron

With Tennessee Furnaces Leading in Price Cutting — Very Little Buying Reported

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg.,
Cincinnati, May 13.

The continued dullness of the pig iron market has caused a few southern furnaces to make concessions on some recent sales in order to induce the melters in question to buy, with the result that the minimum price of southern No. 2 foundry has receded from $12 to $11.75, Birmingham basis. This lower quotation is apparently confined mostly to Tennessee furnaces, and it is quite probable that on desirable business of any size that $11.50, Birmingham, could be done. There are rumors that one Alabama stack has also quoted $11.75 and $11.50, Birmingham, on certain inquiries, but they cannot be verified. At the present time, the majority of furnaces in both states are still on a basis of $12, Birmingham, for their No. 2 foundry iron for any delivery this year, and thus far have refused to make any concessions.

The southern Ohio situation has not changed within the past week. Conditions in this district have been such for the past six months that furnaces cannot very well sell below $15, Ironton basis, for No. 2 foundry iron, and make any kind of a profit, and consequently this is still the general price, despite the fact that very few sales are being made. Offers of business below $15 are constantly being put before them, but they all have been refused up to the present time, and if any concessions have been made they have been of such a secret nature that the market is not generally aware of them.

Despite the inducements of lower prices referred to above in reference to the southern market, transactions remain scarce, thus making it difficult to accurately gage the true level of prices. Offers of iron below market prices are also being kept very secret. The Louisville & Nashville railroad recently purchased 1,200 tons of southern iron for contract shipment, and a Connersville, Ind., melter also took 1,000 tons of northern iron for last half delivery. The inquiry of the Nordyke & Marmon Co., in Indianapolis, for about 1,000 tons is still pending, and there is also an inquiry from central Ohio for about 200 tons of silvery iron.

Coke.—The coke market is a little weaker, and prices in several of the fields have declined slightly. A rather good tonnage of foundry coke is being placed, mostly renewals of old contracts. The furnaces are steadfastly refusing to pay the prices asked. Connellsville foundry coke for contract shipment is being held at $3, but this same grade is obtainable at $2.75, ovens, for prompt delivery. Wise county 72-hour grades can be had at $2.75, ovens, for any delivery. The only changes in the New River district is a reduction of 10 cents a ton on spot furnace coke, it being now $2.50 to $2.60, ovens. Pocahontas prices are unchanged.

Finished Material.—The local sheet market does not show any signs of weakening and despite the fact that spelter is not very strong, galvanized sheets No. 28 are being held firmly at 3.40c, Pittsburgh basis. Black sheets are very strong at 2.35c for No. 28 gage, Pittsburgh. The local mills are running to almost full capacity, the only trouble at the present time being the inability of the railroads to ship with any degree of regularity.

Warehouse business is good, but shipments cannot be made as well as warehouses would like to have them, owing to the fact that the freight handlers on the different railroads in this city have recently gone on a strike. There have been no changes in quotations this week, but those that were lowered last week, including steel bars, iron bars and plates and shapes, show no signs of further weakening.

Old Material.—The scrap iron market is exceedingly quiet. Sales during the past few weeks have been very few and dealers state that all efforts to secure business have met with indifference on the part of the buyers. Mixed cast, for which there has always been a fairly good demand in this market, has been recently selling only in small lots and dealers in most cases find it hard to obtain the market price of $9.50 per net ton. No. 1 machine cast has also fallen off considerably due to the fact that foundries working on machine tool castings are not very busy. Heavy melting scrap is quoted at from $10.75 to $11.25 per gross ton, but it is rumored that the mills using it will not pay this much for it.

Malleable Makers to Sound New York Market

But Price Ideas Are Below Those Which Furnaces Are Willing to Name—Sharp Competition on Structural Contracts

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg.,
New York, May 13.

Iron Ore.—Miners of local New York and New Jersey state ores continue to dispose of a fair tonnage to eastern Pennsylvania furnaces at the range of 7¾c to 8c per unit, delivered, equivalent to about 6c to 6½c per unit at the mines. Strike conditions in some of their mines have caused certain eastern Pennsylvania furnaces to be buyers of ore in the open market. Some reports of lake ores being offered at concessions have been heard from certain eastern districts. Some definite announcement is expected shortly on the offering of Texas ores to eastern furnaces. There is very little interest shown in foreign ores.

Pig Iron. — There is practically a stagnation of business in the local pig iron market. Almost all the new orders that are moving are those for feeling out early needs. Buyers continue in a timid attitude towards forward contracting, apparently in the belief that the decline has not yet spent itself. It must be marked, however, that shipments are keeping up to a high rate and there is little evidence of deferments anywhere. Labor troubles here and there are causing some suspensions. Many of the foundries are facing either actual or incipient discontentment among the molders and there is some apprehension on this score. The American Steel & Wire Co. has purchased 6,000 tons of low phosphorus iron from a New York state maker for last half delivery at Worcester, Mass. A Jersey furnace manufacturer recently took about 1,500 tons of foundry iron. Leading malleable buyers in the east have made some preliminary moves toward sounding-out the market in a large tonnage, but this matter has not reached a definite stage. The price ideas of these consumers are reported around $17, delivered Connecticut points, but this is considerably below what the furnaces will do at present. Prices remain easy generally. Though lower has been reported, the minimum price for eastern Pennsylvania No. 2X remains around $16, furnace, or $16.70, tidewater. Virginia iron is more squarely on a basis of $14.50, furnace, for No. 2X, and it is not unlikely this could be shaded on a desirable offer. Buffalo No. 2X ranges from $15 to $15.50, furnace. Sales have been made into New England at the low figure, or $17.45, delivered. The Thomas Iron Co. has blown out one of its Alburtis furnaces, making the second of interest and the third stack in the Lehigh valley to retire in a few days. A new inquiry for 5,000 tons of foundry iron for shipment to southern Europe has made its appearance in this market.

Ferro-Alloys.—Lower prices on ferro-manganese have been reported from different districts and these have been ascribed largely to the activities of one seller. Usually, the shading in these casts of the established $51, seaboard price has not exceeded $1 a ton, but several carloads are understood to have been sold in the Philadelphia district on the basis of $59, seaboard, or less. The going business in the market is largely carloads and there is not much tonnage of these. Consumers of ferro-manganese generally, either are not greatly concerned over the proposed increase in duty upon this alloy or they are confidently expecting the objectionable paragraph to be revised in the Senate. The changes in the freight rates on ferro-manganese from eastern seaboard to different consuming points went into effect May 12. Small sales of domestic spiegeleisen at about $30, seaboard, are noted. Carload inquiries for 50 per cent ferro-silicon are current.

Plates.—The more deliberate buying of equipment by the railroads continues apparent and it is estimated by car builders that the live inquiries in the market aggregate only about 10,000 cars. As the shops of builders are filled to capacity on the average for about three months, there is no apprehension over the slower buying, but competition may become more spirited toward summer, if present conditions do not change. The Cuban railroad has placed a number of steel underframes with the American Car & Foundry Co. The Havana Central has ordered 50 gondolas from the Pressed Steel Car Co. The Newburgh & South Shore railroad is inquiring for 35 steel cars. Plate prices with eastern Pennsylvania mills remain on the basis of 1.60c, Pittsburgh, for tank steel, with $1 extra steel sometimes asked on universals. New business is lighter and deliveries can be made in a few weeks.

Structural Material.—Sharp competition for tonnage among the fabricated shops in this territory is reflected in the ruling prices for this character of work. Steel for loft construction is going at from $50 to $52, erected, and for apartment work at about $5 higher. The shops are being compensated somewhat for their sharp figuring by the lower prices on plain material from eastern mills. The 1.45c, Pittsburgh, or 1.61c, New York, quotation, on lots of size, has now become more general among the eastern Pennsylvania mills and it reasonably represents the going market on attractive business. Some of the mills are still receiving a $1 or more extra for especially prompt shipment, although their ruling schedules are in such shape that they are now able to give quite prompt service, at the inside price.

New lettings in the metropolitan district have continued light. Considerable tonnage is still backed up awaiting final disposition, buyers apparently holding off for lower prices. The United States Steel Products Co. has about 4,000 tons for a refrigeration plant at Rio Janeiro, Brazil; Post & McCord have the contract for the Burrell loft at Madison avenue and Fifty-third street, about 1,200 tons, and the American Bridge Co. will do the fabrication; the Passaic Steel Co., 500 tons, for the Educational Building on Fifth avenue and the Hedden Iron Works, 250 tons, for the Women's University Club, at 106 and 108 East Fifty-second street. Considerable bridge work is pending. The Delaware, Lackawanna & Hudson has inquiries out for 10 or 12 bridges and the New York Central, Delaware & Hudson, Buffalo, Rochester & Pittsburgh and the New Jersey Central for a small bridge at Elizabeth, N. J., are also in the market. The aggregate of these matters is not large. In the export market, the Manila Railways is inquiring for a round lot of bridge work and the Imperial railroad of Japan is also asking prices on the smaller lots. The National Carbon Co. is asking bids on a new plant at Jersey City, which will require a small tonnage of steel columns.

Bids will be taken by the City of New York on May 20 on 800 tons for improvements of the Brooklyn terminal of the Manhattan bridge.

Iron and Steel Bars.—Buyers of steel bars continue to offer a fair amount of business in odd lots, which the leading mills, because of their long delayed deliveries, are unable to accept. At the same time, there is an easier condition to deliveries, due to the fact that buyers having anticipated their specifications in many cases have now assured themselves of a straight run of shipments. For this reason, also,

premiums for prompt shipment are not so freely placed with the smaller mills. Specifications generally in steel bars are lighter, due largely to the better delivery conditions. There is a fair amount of new bar iron business going to the local and eastern Pennsylvania mills at prices ranging from 1.50c to 1.60c, New York.

Merchant Pipe.—Jobbers of merchant pipe in the metropolitan district have reduced their prices out of store by the adoption of a flat list of discounts to apply both within and without the metropolitan district. Heretofore, there have been varied sets of discounts for these two deliveries. The reduction amounts to about $2 a ton for direct shipments and slightly more for delivery to outside points.

Cast Iron Pipe.—Private buyers of cast iron pipe are not coming into the market as freely as is usually the case at this period of the year and they apparently are going more slowly in placing orders for forward delivery. There is a considerable amount of public work, however, in the market. John Fox & Co. received the 600 tons for Manhattan and the Bronx and the pipe will be furnished by the Warren Foundry & Machine Co. A contractor's letting, involving 2,000 tons for Brooklyn, was let by the Department of Water Supply, Gas and Electricity, but the pipe has not yet been placed with a foundry. Lowell, Mass., will receive bids May 15 on 1,125 tons, principally 24s, and Fitchburg, Mass., on the same day on about 600 tons of 4 to 36-inch. Competition for orders in cast iron pipe is still rather keen and prices are irregular.

Old Material.—The market remains very heavy and prices continue to lose ground weekly. As the decline continues, consumers show no great anxiety to take on tonnage and are closing only in a scattered fashion. Heavy steel has reached the level of $12.50, delivered, eastern Pennsylvania, from sales made this week and dealers have dropped their prices in accordance. The American Bridge Co. has purchased about 2,500 tons of detinned scrap delivery at its Pencoyd plant at around $11.50, delivered. Turnings and borings are very weak as the supply is plentiful. None of the yards in the metropolitan district is amassing much stock. A Jersey yard has purchased the old material amounting to about 1,200 tons, chiefly beams and cast columns in the old Drexel building, Wall street, now being demolished to make room for the new banking house of J. P. Morgan & Co.

Repairs to the Reading Iron Co.'s Keystone furnace are still under way and it will likely be July before the furnace will be operated.

Birmingham Pig Iron Market Dull

Prospects for Increased Buying Not Encouraging—Stocks Increased Last Month

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., May 13.

Pig Iron.—The inquiry pending at the time of last report has added but little tonnage to order books, and the prospects are not encouraging for more extensive trading in the market within the immediate future. Such small requirements as are in urgent need are being placed, and at figures in line with the established quotations on prompt deliveries; but the aggregate involved is very small comparatively, and only a part of the requirement is being furnished by the furnace companies. Probably less interest is being manifested in advanced requirements than at the beginning of the month, and while the selling interests insist that a basis of $12 per ton at Birmingham for No. 2 foundry is the minimum consideration, and must be maintained, it is very evident that the larger consumers have a lower figure in view, even for such tonnage as is to be engaged for delivery prior to July 1. The reported shading of a $12 basis in certain competitive territory is not confirmed, but it is likely that freight advantages have recently been sacrificed in several markets. For the week just ended, one large producer reports the sale of an aggregate of 1,000 tons of No. 2 foundry, for early delivery, at figures around $12 per ton at Birmingham; another producer reports the sale of 450 tons of high silicon iron at $13 per ton, Birmingham; 750 tons of No. 2 soft, at $12, Birmingham, for delivery in 90 days, is reported by another, and 500 tons of No. 2 foundry for export, were entered by another concern. The sales just mentioned are believed practically to cover the trading in the week, except those made by merchant interests and individuals, from warrant yards. This last has met the carload lot demand to quite an extent, and at figures from 25c to 50c per ton lower than the furnace price.

From the most reliable information obtainable, the aggregate stock accumulation on furnace yards was increased some 23,000 tons during the month of April. Actual figures in this have not been furnished, but it is understood that the increase is represented in the free holdings of high foundry grades. The furnace production has been reduced temporarily by the banking of one Bessemer, Ala., stack for repairs.

Cast Iron Pipe.—Forwardings against contracts in the past week were very satisfactory, but the volume of new business placed was very light. In all quarters of the trade, the arrangements for finances for the several improvements and extensions under consideration are being delayed more or less, and the actual requirement, which involves small quantities in the majority of cases, is being provided.

Old Material.—Practically no interest is being manifested in other than machinery grades, and the prices recently offered for this last were not attractive to dealers. The movement from local yards in the past week was probably smaller than for any week in some months, and the unfilled tonnage on contracts was reduced to a more appreciable extent. In short the local market is in a very chaotic condition, and with the continued decline in pig iron prices, an improvement can hardly be expected within the near future.

SMALL SALES

Of Pig Iron in the St. Louis District—Coke Dull.

Office of THE IRON TRADE REVIEW,
St. Louis, May 13.

Sales of pig iron in the St. Louis territory last week consisted of 500 tons of Clifton iron and 1,000 tons of southern No. 2 for delivery in East Moline, Ill., and several small lots for St. Louis delivery. There are no new inquiries out today, but those for one for 600 tons of southern, 1,200 tons of southern and 1,000 tons of southern, put out 10 days ago, have not been closed or withdrawn. Southern No. 2 is quoted in this market at $12, Birmingham basis, with a possibility that some southern iron has recently been sold as low as $11.50, but it is doubtful if this was from the Birmingham district. Northern iron is quoted at $15.75, Chicago, and $15.25, Ironton, with practically no inquiry.

Coke is in little demand, with prices stationary at $3, ovens, for Connellsville 72-hour grades, and $2.25, ovens, for 48-hour furnace grades.

No trading in scrap worth mentioning is going on, and there are no lists out today. Prices remain unchanged.

British Pig Iron Prices Decline Sharply

Recent High Quotations Due to Speculation—Conditions in Finished Materials Very Unsatisfactory

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., May 3.

Pig Iron.—The week has been one of falling prices, smelters being quite unable to resist the persistent downward pressure. At the same time, contracts are for quite trifling amounts. Yesterday's quotation was at 66s 10d ($16.36), cash, with three months 62s ($15.18). Yesterday, there was a fall of 3s in quotations for monthly iron, and the general price for cash transactions shows a reduction of 2s on the week. There is a greater inclination to settle down to legitimate business but buying will not be generally resumed until the end of the Balkan trouble has settled the market. It is recognized that the record figure of last week was due to speculative operations. There has been a little increase of stocks at Middlesbrough, the total now being 214,000 tons. The smelters dealing with the Birmingham exchange show a greater inclination to compete for business. The present quotation for Northampton forge iron is 63s ($15.42), but it is clear that the bottom has not yet been reached.

Finished Iron and Steel.—The finished iron trade continues thoroughly unsatisfactory, except in the best iron departments, which really represents only a comparatively small proportion of the make. The full effect of the Balkan troubles is now being felt by the makers of Staffordshire common iron. Belgium having lost an important market is dumping No. 2 bars into the nut and bolt district of South Staffordshire, at £6 10s to £6 15s, which is from £1 to 25s below local quotations. Apparently there is no need to cut prices quite so severely in order to defeat the British makers of material. The effect of this competition is badly demoralizing South Staffordshire prices.

Another effect of iron trade dullness is a falling off in the demand for puddled bars, which a year ago were very much called for. Apparently, these can hardly now be sold at any price. Very little also is heard of the scarcity of puddlers.

Things appear to be going from bad to worse in the Welsh tin plate trade. At least 130 mills are now idle, and the trade is passing through a very severe crisis. A special meeting of the conciliation board is to be held next week, when the men will propose that the whole of the works shall be shut down for one month in July, to relieve the overstocked market. There are now over 3,000 workmen entirely unemployed, and some of the oldest tin plate makers declare they have never known business in such a bad way.

SLIGHT IMPROVEMENT

In Pig Iron Sales at Buffalo—New Structural Contracts.

Office of THE IRON TRADE REVIEW,
Buffalo, May 13.

Pig Iron.—The sales for the week aggregated about 8,000 tons of all grades, showing an improvement over the previous week's trading. The labor situation is still a source of trouble to a number of the foundries of the district. With forces thus reduced, they are making a demand on the furnaces for iron that is going forward in good volume. If the labor troubles were out of the way it is claimed the consumers would use considerable more iron to get out orders for their materials under contract. Prices remain the same.

Finished Material.—Prices remain firm on bars and the other lines. Wrought pipe specifications show improvement. The impression prevails that a revival of buying will not develop until the mills are in a position to make deliveries within the quarter ordered. Black and galvanized sheets show a good demand with deliveries being made in four to six weeks. A few of the smaller eastern mills are still offering to make 30-day deliveries on bar materials at 1.50c, base. There is a fair demand for bolts and nuts, with prices apparently a little easier. The only cancellations so far noted have been on the part of agricultural implement makers, who were forced to secure material from the warehouses on account of the inability of the mills to make deliveries within the time required by these users to get their products out for the next season's business.

In structural shapes the market is strong with a considerable tonnage being fabricated and still more being planned for by the architects. Idlitz & Ross, of New York City, were low bidders for the steel required for the New York Telephone Co.'s new building at Rochester, N. Y., taking about 800 tons. The Buffalo Structural Steel Co. was given the contract for the steel to be used in the erection of the addition to the Buffalo Smelting Works, recently destroyed by fire; 200 tons will be needed. The American Bridge Co. received the contract for the addition to the Manufacturers' & Traders' National Bank, Buffalo, taking about 300 tons.

Old Material.—Business continues slack and the volume of trading sporadic and small. The dealers are still holding off for an improvement in the situation, and show little or no inclination to accept what offers have materialized at present prices.

METAL MARKETS

New York

May 13.

Copper.—The favorable copper statistics for April inspired a good volume of buying by foreign and domestic consumers. Orders were booked for a large total of business at 15.75c, delivered 30 days, following the report of the Producers' Association, and the general market has advanced to 15.87½c for electrolytic. At the latter level leading sellers report that sales have been satisfactory.

Tin.—Demand from consumers has been light during the past week, but local supplies are closely held, and prices have remained well up to parity with London quotations.

The foreign markets were closed from Friday to Tuesday. Business was resumed today at advances of about £1 over Friday's closing, but the market declined toward the end of the day, and final prices were under the opening. Spot closed at £229 10s and three months at £219 10s. Arrivals of tin since May 1, aggregate 1,947 tons, and there are 1,195 tons afloat.

Antimony.—The market is unchanged. Cookson's is 9c, Hallett's is 8.50c and other brands 7.50c to 7.75c.

Chicago

May 13.

New Metals.—This market displays conflicting tendencies, copper being considerably firmer while spelter continues weak.

We quote dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 15¾c; casting, 15¾c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 5.40c; lead, desilverized, 4.30c; sheet zinc, $7.75, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 50.12c; Cookson's antimony, 9⅛c; other grades, 7⅝c.

EXTENSIVE PLANS

For Improvements at Steelton and Sparrows Point Plants.

Fuller details of the extensive improvements to be made to the plants of the Pennsylvania Steel Co., at Steelton, Pa., and of the Maryland Steel Co., at Sparrows Point, Pa., are now announced. The first series of extensions to be made will involve an expenditure of about $3,000,000, bonds for which have already been sold, as recently announced. The ultimate cost of all the improvements that are to be made to the Pennsylvania and Maryland Steel Co. plants during the next several years was estimated by President Felton, in his annual report published last week, to be about $10,000,000.

At the Steelton plant, the improvements provide for the building of a complete new duplexing unit for steel making. This will consist of two continuous 75-ton open-hearth furnaces of the company's own design, a Bessemer converter, hot metal mixer, new blowing equipment, etc. The installation of a complete new duplexing plant will place the company's steel production by this process upon a more modern and economical basis than as now conducted. At present, the Bessemer and open-hearth plants at Steelton are located at considerable distance from each other, which involves much transportation of material. A new 75-ton stationary open-hearth furnace will be added to the present open-hearth capacity. When the new duplexing plant and the additional open-hearth furnace are in operation, it is proposed to abandon, for normal operations, the present Bessemer plant and a number of the present open-hearth furnaces. This steel making equipment, however, will not be dismantled, but will be retained for operation in times of unusual demand and in emergencies. These alterations of the steel works at Steelton will involve under normal conditions little change in the present ingot capacity. Other improvements to be made at Steelton will be the enlargement of the present merchant mill, to enable it to roll a wider and larger assortment of shapes and sizes, the installation of a second gas blowing engine in the blast furnace department and the installation of a large press for the forge department.

Probably the most important improvement to be made to the Sparrows Point plant of the Maryland Steel Co. will be the installation of a 24-inch structural and bar mill. At the present time, the finishing capacity of this plant consists exclusively of a rail mill. The blooming equipment now in service at this plant will be sufficient, with some enlargement of reheating facilities, to meet the increased demand of the finishing department. Two of the blast furnaces will be remodeled and rebuilt. One of these will be completed this year. Two of the four furnaces have already been rebuilt and enlarged during the past few years. A contract has been let to the Bethlehem Steel Co. for the installation of five gas engines for a new blast furnace blowing plant. A contract has also been let for the building of 120 Koppers by-product coke ovens. Aditional gas washing apparatus will be put in and a new mixer added to the Bessemer department.

Work upon the completion of these improvements will be pushed at once, and, as noted, some of the important contracts have already been awarded. It is expected that the present program of extensions and enlargements will be completed in about a year's time.

SAFE OPERATION

Of Plants Discussed at Meeting of Philadelphia Foundrymen.

An address on the "Proposed Workmen's Compensation Act of Pennsylvania", by Harry J. Shoemaker, secretary of the Pennsylvania Manufacturers' Association, Doylestown, Pa., was the feature of the 228th meeting of the Philadelphia Foundrymen's Association, held at the Hotel Walton, Philadelphia, on the evening of May 7. The meeting was well attended and was followed by a buffet luncheon.

Mr. Shoemaker, who was introduced by Thomas Devlin, president of the Foundrymen's Association, explained in detail the various features of the workmen's compensation act, which has already been passed by the house of representatives of the Pennsylvania legislature and is now in the hands of a committee, to which it was referred by the senate for amendments.

Mr. Shoemaker added that the enactment of the bill is not opposed by the Pennsylvania railroad and the United States Steel Corporation. He gave it as his opinion that these corporations are able, on account of the large number of men they employ, to expect a certain number of accidents every year and hence they would be able to add their accident liability to the cost of their product.

The James McNeil & Bro. Co. has finished several steel plate specials for the city of Pittsburgh.

WILSON OBJECTS

To the Labor Trust Proviso, But Will Sign Sundry Civil Bill.

Washington, May 13.—Pointing out his objections to the exemption clause in the sundry civil bill, which will reach and be signed by him this week, it is expected, President Wilson will take the ground that the question of exemption from the law should be settled in general legislation, making the Sherman law clearer and broader. No such clause has a right in an appropriation bill, in the opinion of the president. The provision which exempts the labor and farmers' unions from the operations of the Sherman law, so far as the particular fund is concerned, will, it is understood, be declared useless by the president, because it merely prevents the application of a certain fund for prosecution purposes. The fund is available for only one fiscal year, beginning July 1 and ending June 30, 1914. Other funds can be employed by the administration in enforcing the Sherman law against the organizations mentioned in the exemption clause. Elimination of the provision would do no good, the president was told at the beginning of his administration, as the house would pass the bill anyhow.

The bill, which passed the senate last Wednesday night by viva voce vote, was subject of much debate. The vote was 41 to 32 against the amendment offered by Senator Gallinger striking out the exemption clause. Senator Cummins tried to have congress take up the question of exempting labor and farmers' organizations from the Sherman act, directly, and not by legislation in an appropriation bill.

"These provisos do not change the Sherman act," said Senator Root. "What they undertake to do is to say that certain classes of the people of the United States may commit such criminal acts and shall not be prosecuted, while certain other classes who commit crime under the same criminal acts shall be punished. I can conceive of no more injurious blow to this great statute."

Among those upholding the provision was Senator Stone, of Missouri, who argued that funds, aside from those in the appropriation bill, could be employed to punish labor unions and farmers' organizations for criminal acts.

Laborers at Gary, Ind., gave their foreman an unusual ultimatum last week. They said they would have to be given longer hours or they would strike.

MOLDERS RESTLESS

And Some Have Gone on Strike—Effect on the Market.

More or less restlessness among foundry labor has been in evidence recently in different eastern operating centers. In some of these cases, such as Burlington, N. J., strike conditions are faced by the employers. At the present time, the Burlington situation shows considerable improvement and operations are being gradually re-established on a normal basis. In the Philadelphia district, the molders have asked for an advance of 25 cents over their present rate of $3.50 a day, and have also asked the proprietors of their shops to give them a final answer by May 15. There has been some similar talk among the men at the eastern New Jersey and southern New York points, included in the metropolitan district. While in many of these cases formal demands have not yet been made for advances, there are indications that such steps are under consideration among the men. A short time ago, bench molders in the New York district were advanced in many shops from $3.25 to $3.50 a day, or on the same basis as floor molders. Now a general molding advance of 25 cents is asked in a number of shops.

The restlessness of foundry labor in the east is causing considerable attention to be given it by pig iron makers. Whatever suspensions of shipments have been received by the latter from consumers of late have been largely due to shop disturbances of this character. At the present time, the situation is such that developments during the next few weeks may make it a considerable market factor.

Will Ship Texas Ore

The East Texas Brown Ore Development Co., which controls 20,600 acres of iron ore land in northeastern Texas, expects to commence shipments to the Atlantic coast ports by way of Galveston in the latter part of June. Initial shipments will be at the rate of approximately 300 tons a day. The first cargoes will be consigned to Philadelphia for the Alan Wood Iron & Steel Co. B. Nicoll & Co., Singer building, New York, are agents for the ore. The ore will be hauled from the mines to Galveston over the Santa Fe railroad and will be loaded at Galveston from a dock recently constructed by the Santa Fe.

Institute Directors.—At the annual meeting of the members of the American Iron and Steel Institute held at the institute headquarters, May 5, the following directors were unanimously re-elected: Edward Bailey, Harrisburg; John G. Butler Jr., Youngstown; Edmund A. S. Clarke, New York; Willis L. King, Pittsburgh; Samuel Mather, Cleveland; William H. Donner, Pittsburgh; John A. Topping, New York.

Dismantling Two Old Furnaces

The abandoned coke blast furnace of the Franklin Iron Mfg. Co., at Franklin Springs, N. Y., which was recently purchased by Frank Samuel, Philadelphia, has been sold to Mayer Pollock, Pottstown, Pa., dealer in old material. Mr. Pollock has also purchased the old equipment of the idle iron mine at Clinton, N. Y., near by the furnace. Both the blast furnace and the mine equipment are being dismantled and the material is being sold to scrap consumers. The Pollock firm has also purchased the old blast furnace at Clinton, N. Y., formerly operated by the Courtlandt Iron Co., and is dismantling the plant. The Franklin Springs furnace was built in 1871 and remodeled in 1883. It was operated in 1907.

Locomotive Orders

The New York Central system, which recently placed 114 locomotives with the American Locomotive Co., has distributed additional orders with this maker and has also given the Baldwin Locomotive Co. 20 locomotives. The American Locomotive Co. has also taken two consolidation freight locomotives from the Charlotte Harbor & Northern railroad, two superheater Mountain type locomotives from the Chicago, Rock Island & Pacific railway, two Prairie type locomotives from the Ferro Carril de Amaga of Columbia and one six-wheel switching locomotive each from the Solvay Process Co. and the Aluminum Co. of America.

Increase for Puddlers

The wage rate for puddlers and bar mill workers during May and June will be $6.75, an increase of 25 cents over the previous bi-monthly rate. This figure was reached May 13, following an examination of the sales sheets of the Republic Iron & Steel Co., Youngstown, O., Cleveland Rolling Mill Co., Cleveland, and the Highland Iron & Steel Co., Chicago. It was found that bar iron was selling on a 1.50c card. The wage agreement for 1912-1913 ends with this period, but workers believe the present agreement will be ratified at the annual convention of the Amalgamated Association of Iron, Steel and Tin Workers.

FURTHER REDUCTIONS

May Be Made by the Senate in the Metal Schedule.

Washington, May 14.—Further cuts are proposed in the metal schedule of the Underwood tariff bill. This has just become definitely known, and verifies reports of past few days. Coming from a source of unquestioned authenticity, it is announced that Senator Stone, of Missouri, chairman of the sub-committee of the Senate finance committee having the metal schedule in charge, has admitted that the sub-committee has taken a vote in which it was decided to cut iron and steel products lower than was done by the house. The latter fact is an entirely new development.

Especial attention was given ferromanganese by the sub-committee. The amount of cuts has not been arrived at and further action in this direction will not be taken pending consideration of the Penrose motion to instruct the finance committee to hold public hearings.

The motion will be defeated in all probability and further consideration of schedules taken up by the sub-committees.

It is said that those in charge of the metal schedules consider it a disadvantage to independents to have to pay the proposed 15 per cent ad valorem duty about $6, per ton higher than the Payne law when the United States Steel Corporation makes its own alloy.

The general proposed cut is based on the theory that monopoly controls the iron and steel business. It is thought the president will not oppose changes contemplated in the metal schedule.

Death of Frederick N. Gardner

Beloit, Wis., May 13.—Frederick N. Gardner, president of the Gardner Machine Co., Beloit, Wis., and one of the best known men in the grinder and tool building industry of America, died at Beloit late Sunday night, May 11, after an illness of six days, of pneumonia. Mr. Gardner was 63 years old.

In 1890, Mr. Gardner became associated with the C. H. Besley Co. as superintendent of its Beloit works, later becoming general manager of the company's local interests. In 1905 he resigned to organize the Gardner Machine Co. of Beloit, to manufacture disc grinders and other tools. He was widely known as an inventor and designer.

IRON AND STEEL PRICES

Pig Iron

PITTSBURGH

(Through Third Quarter.)

Bessemer	$17.90
Basic	16.40 to 16.65
No. 2 foundry	15.90
Malleable	15.90
Gray forge	15.40

The freight rate from valley points is 90c.

CLEVELAND

(Through this Year Delivered in City.)

No. 1 foundry	$16.25 to 16.75
No. 2 foundry	15.75 to 16.25
No. 2 southern	16.35 to 16.85
Bessemer	17.90
Lake Superior charcoal	19.10
Silveries 8 per cent silicon	20.55

CINCINNATI

(Through This Year.)

Southern foundry No. 1	$15.50 to 16.00
Southern foundry No. 2	15.00 to 15.50
Southern foundry No. 3	14.50 to 15.00
Southern foundry No. 4	14.25 to 14.75
Southern gray forge	14.00 to 14.50
Mottled	14.00 to 14.25
Southern No. 1 soft	15.50 to 16.00
Southern No. 2 soft	15.00 to 15.50
Standard southern car wheel	27.25 to 27.75
Southern Ohio No. 2	16.20 to 16.70
Southern No. 3	15.70 to 16.20
Southern Ohio No. 4	15.45 to 15.95
Silveries 8 per cent silicon	19.70 to 20.20

CHICAGO

(Delivered Chicago, this year, except northern foundry and malleable, which are quoted f. o. b. local furnaces.)

Lake Superior charcoal	$18.00 to 19.25
Northern foundry No. 2	16.50 to 17.00
Southern foundry No. 2	16.35 to 16.85
Jackson co. silveries, 8 per cent	21.40
South'n silveries, 5 per cent sil.	18.35
Alabama basic	17.85
Malleable	16.50 to 17.00

PHILADELPHIA

(Prompt and second quarter shipment delivered to consumer's plants, in Philadelphia and vicinity, unless otherwise specified.)

Northern No. 1X foundry	$17.25 to 17.50
Northern No. 2X foundry	17.00 to 17.25
Northern No. 2 plain	16.50 to 16.75
Standard forge (Eastern, Pa.)	15.75 to 16.00
Virginia No. 2X	17.30 to 17.80
Southern No. 2	16.20 to 16.50
Standard low phos. Phila.	23.50
Malleable	17.75 to 18.00
Basic (Eastern & Central Pa.)	16.50

NEW YORK

(Prompt and second quarter delivery, prices based at Jersey City and tidewater.)

Northern No. 1X foundry	$17.00 to 17.25
Northern No. 2X foundry	16.75 to 17.00
Northern No. 2 plain	16.50 to 16.75
Virginia No. 2X	17.30 to 17.55
Southern No. 2	16.50 to 17.00
Malleable	17.50 to 18.00
Gray forge	16.00 to 16.25

ST. LOUIS

(Throughout this year.)

Southern No. 1	$16.00 to 16.50
Southern No. 2	15.50 to 15.75
Southern No. 3	15.00 to 15.50
Southern No. 4	14.75 to 15.00

(Freight, Birmingham to St. Louis, $3.75)

BIRMINGHAM

(High quotation, last half; low quotation, to July 1.)

No. 1 foundry	$12.50 to 13.00
No. 2 foundry	12.00 to 12.50
No. 3 foundry	11.50 to 12.00
No. 4 foundry	11.00 to 11.50
Gray forge	10.75 to 11.25
Mottled	10.50 to 11.00
Standard basic	12.00 to 12.50
Off basic	11.00 to 11.50
Charcoal	25.00 to 25.50

In non-competitive, or strictly southern territory, the figures furnished above for the remainder of the first half, would be advanced 25c to 50c per ton on spot deliveries.

BUFFALO

(Through this year, delivered in city.)

No. 1 foundry	$15.75 to 16.00
No. 2X foundry	15.50 to 15.75
No. 2 plain	15.50
No. 3 foundry	15.25 to 15.50
Gray forge	15.25
Malleable	16.00
Basic	16.25 to 17.00
Charcoal	18.00 to 19.00

Ferro Alloys

English 80 per cent ferro-manganese, $59 to $61, seaboard, early and forward.

Fifty per cent ferro-silicon on contracts, $75, Pittsburgh, or Philadelphia, for carloads; $74 for larger lots and $73 for 600 tons or more. Twelve to 13 per cent, $26. Eleven to 12 per cent, $25. Ten to 11 per cent, $24. Nine to 10 per cent, $23, f. o. b. Globe, Jisco and Ashland furnace. Freight to Pittsburgh, $1.90.

Ferro-carbon titanium 8 cents per pound for carload lots; 10 cents per pound for 2,000-pound lots and over; 12½ cents per pound in lots up to 2,000 pounds.

Freight rates on ferro-manganese, foreign spiegeleisen and electrolytic ferro-silicon from Baltimore to Pittsburgh, $2.16; to Youngstown, $2.48; to Cleveland, $2.57; to Detroit and Columbus, $2.99; to Cincinnati, $3.40; to Chicago and Milwaukee, $4.00. Freights from Philadelphia and New York, 10 and 30 cents higher respectively.

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds, to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
St. Louis	22½ cents
Denver	84½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, shapes and plates	80 cents
Pacific coast, sheets, No. 11 and heavier	80 cents
Pacific coast, sheets, Nos. 12 to 16	85 cents
Pacific coast, sheets, No. 16 and lighter	95 cents
Pacific coast, wrought pipe and boiler tubes	65 cents

Coke

AT THE OVENS.

Connellsville district:	Prompt shipment.	Contract.
Foundry coke	$2.85 to 3.25	$3.00 to 3.25
Furnace coke	2.00 to 2.25	2.50
Wise county district:—		
Foundry coke	$2.75 to 3.00	$2.75 to 3.00
Furnace coke	2.25 to 2.50	2.25 to 2.50
Pocahontas district:—		
Foundry coke	$2.75 to 3.00	$2.75 to 3.00
Furnace coke	2.25 to 2.50	2.50
New River district:—		
Foundry coke	$3.25 to 4.00	$3.25 to 4.00
Furnace coke	2.50 to 2.60	2.60 to 2.90

Iron Ore

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40; all at lower lake ports.

Foreign iron ores, 7½ to 8 cents per unit, f. o. b. cars eastern seaboard. Freight rates from Philadelphia to eastern Pennsylvania, furnace points range from 35 to 75 cents per ton.

Billets and Sheet Bars

PITTSBURGH

For prompt delivery, Bessemer 4 x 4 billets with 0.25 carbon and less, $28.00, Open-hearth rolling billets, $28.50; Bessemer sheet and tin bars, $28.50 to $29.00; open-hearth sheet bars, $29.00, f. o. b. Pittsburgh and Youngstown. Forging billets, $35 to $36, Pittsburgh. For forward delivery Bessemer and open-hearth sheet bars, $27.50 to $28.00.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: 4 x 4-inch open-hearth and Bessemer rolling billets at $28 to $30, and forging billets at from $35 to $36.

Standard Shapes

PITTSBURGH

Standard structural shapes, 1.45c to 1.50c for forward shipment. For extras see card of Sept. 1, 1909.

CHICAGO

Standard structural shapes, 15 inch and under, 1.63c to 1.68c.

PHILADELPHIA

Delivered to consumers in Philadelphia and vicinity. Standard structural shapes from Eastern Pennsylvania mills on contract 1.60c to 1.65c; for prompt delivery, 1.60c to 1.70c. From Pittsburgh mills 1.60c.

NEW YORK

Standard structural shapes for second quarter delivered at New York by eastern Pennsylvania makers 1.61c to 1.71c. On third quarter and last half contracts, Pittsburgh district makers are quoting from 1.61c to 1.66c, New York.

Plates

PITTSBURGH

Standard steel plates ¼ inch thick, 6¼ to 100 inches, 1.45c to 1.50c for forward shipment and 1.50c to 1.60c for prompt shipment. For extras, see card of Sept. 1, 1909.

CHICAGO

Tank plates, 1¼ inch thick, 6⅝ to 100 inches wide, 1.63c to 1.68c.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity. Tank plates from eastern Pennsylvania mills for prompt or contract delivery 1.75c; universal plates 1.75c to 1.80c. From Pittsburgh mills, tank and universal plates 1.60c to 1.65c.

NEW YORK

Steel plates, tank quality, for second quarter delivery at New York by eastern Pennsylvania makers, 1.76c. On small lots of universal plates $1 extra asked by some makers on third quarter and last half contracts.

Pittsburgh makers are quoting 1.61c to 1.66c, New York.

Sheets and Tin Plate

PITTSBURGH

No. 28 black	2.35c
No. 28, tin mill black	2.30c
No. 28, galvanized	3.40c to 3.50c
No. 10 blue annealed	1.75c
Painted corrugated	2.55c
Galvanized corrugated	3.55c
Tin plate, 100 pound cokes	$3.60

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: No. 10 gage annealed sheets at 1.90c.

Pipe and Boiler Tubes

PITTSBURGH

	Black.	Galv. Butt weld.
Steel, ¾ to 3 inches	79½	71
Iron, ¾ to 2½ inches	73	62
BOILER TUBES.		
Steel, 3½ to 4½ inches	70	..
Iron, 3½ to 4½ inches	58	..

Other sizes of pipe and tubes take the usual advances as per official boiler tube cards.

Rails and Track Material

PITTSBURGH

Steel rails, 50-pound and heavier, 1.25c per pound carload less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, base, Pittsburgh; track bolts, 2.40c to 2.50c, base, Pittsburgh.

Railroad spikes, 4½, 5 and 5½ and 9-16 inch, 1.80c.

CHICAGO

Light rails, carloads, 25 to 45-pound, 1.25c, base; 16 to 20-pound, 1.30c; 12-pound, 1.35c; 8-pound, 1.40c.

Light section relayers, 45 pounds and under, subject to inspection, $22 to $23; standard section relaying rails, subject to inspection, $23 to $24.

Track fastenings f. o. b. Joliet:

Angle bars, 1.50c; railroad spikes, 1.90c to 1.95c; smaller size spikes, 2.05c, base; track bolts with square nuts, 2.30c to 2.40c.

Bars, Hoops and Bands

PITTSBURGH

Common iron bars, 1.70c to 1.80c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator 1.40c; channels, angles, zees, tees, under 3 inch, 1.50c, all f. o. b. mill.

Hoops in carload lots, 1.60c, Pittsburgh, in less than carload lots, 1.65c; bands, 1.40c, base, with net extras, as per standard steel.

Cold rolled and ground shafting, 58 per cent off in carloads and 53 per cent in less than carloads delivered in base territory.

CHICAGO

Bar iron 1.57½c to 1.62½c; hard steel bars, rerolled, 1.65c to 1.75c; soft steel bars, bands and small shapes, 1.58c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting, 58 per cent off list for carload lots, 53 per cent off for less than carloads.

PHILADELPHIA

Delivered in consumers' plants in Philadelphia and vicinity: Steel bars 1.55c to 1.60c on contract and common bar iron, 1.55c to 1.60c. Prompt steel bars on mill shipments, 1.85c to 1.90c, delivered. Cut nails 1.90c to 1.95c, Philadelphia. Shafting 58 and 53 off in base territory.

NEW YORK

Delivered in New York, steel bars on contract from 1.56c to 1.61c, and common iron bars, 1.52c to 1.60c.

Bolts, Nuts and Rivets

Rivets

Button head structural rivets, 2.15c to 2.20c, Pittsburgh, cone head boiler rivets, 2.25c to 2.30c. Small rivets, 75, 10 and 10 off.

Structural rivets, Chicago, 2.08c to 2.18c; boiler rivets, 0.10c extra.

Bolt and Nut Discounts

(Delivered within a 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller and shorter, rolled threads, 75 and 10; cut threads 75 and 5; larger and longer, 70 and 2½.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled 75, 10, and 5; cut, 75 and 10; larger and longer, 70 and 7½.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.70 off list; hot pressed hexagon blank or tapped, $6.30.

Cold pressed C. & T. square, blank or tapped, ⅝-inch and larger, $6.60 off; ½-inch and smaller, $7.20 off.

Wire Products

PITTSBURGH

Wire nails, jobbers' carload lots, $1.80, retailers' carload lots, $1.85, cut nails (western makers), jobbers' lots, $1.70; painted barb wire, jobbers' carload lots, $1.80; retailers' carload lots, $1.85, with 40c for galvanizing; plain wire to jobbers in carloads, $1.60; and to dealers in carloads, $1.65; polished staples, $1.80; galvanized staples, $2.20.

CHICAGO

Wire nails, jobbers' carload lots, $1.93 to $1.98; retailers' carload lots, $1.98 to $2.05; retailers' less than carload lots, $2.03 to $2.08; painted barb wire, jobbers' carload lots, $1.93 to $1.98; retailers' carload lots, $2 to $2.05; retailers' less than carload lots, $2.03 to $2.08, with 40c for galvanizing; plain wire, jobbers, carload lots, $1.73; retailers' carload lots, $1.78.

Cast Iron Pipe

CHICAGO

Four-inch water pipe, $28.00; 6 to 12 inches, $27.00; larger sizes, $25.00; gas pipe, $1 a ton higher.

NEW YORK

Six-inch pipe, $23 to $25, f. o. b. New York, in carload lots.

BIRMINGHAM

Water main: 4-in., $22.50; 6-in. and up, $20.50. Gas main: $1 per ton higher than water main. Special fittings, $45 to $47.50.

Old Material

PITTSBURGH

Gross tons delivered.

Heavy melting scrap	$13.75 to 14.00
Rerolling rails	16.00 to 16.50
Malleable	13.00 to 13.50
Agricultural malleable	12.75 to 13.00
Bundled sheet scrap	10.00 to 10.50
Iron axles	25.50 to 26.00
Old iron rails	15.50 to 16.00
Stove plate	10.00 to 10.25
No. 1 wrought scrap	15.00 to 15.25
Old car wheels	14.50 to 14.75
Low phosphorus	16.00 to 16.25
Machine shop turnings	7.75 to 8.00
No. 1 busheling	12.75 to 13.00
Cast borings	9.75 to 10.00
No. 1 cast scrap	14.25 to 14.50

PHILADELPHIA

Gross tons, delivered to consumers' plants in eastern Pennsylvania and western New Jersey:

Old iron rails	$17.50 to 18.00
Old steel rails (rerolling)	15.00 to 15.50
No. 1 heavy melting steel	12.25 to 12.75
Old car wheels	14.00 to 14.50
Old iron axles (nominal)	26.00 to 27.00
Old steel axles	17.50 to 18.00
No. 1 railroad wrought	15.00 to 15.25
Wrought pipe	12.00 to 12.50
Cast borings	9.00 to 9.50
Machine shop turnings	8.75 to 9.25
Heavy cast (broken)	13.25 to 13.75
Malleable	12.50 to 13.00
Stove plate	10.00 to 10.50
No. 1 forge	11.00 to 11.50
Low phosphorus	16.75 to 17.25

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

CLEVELAND

Gross Tons

Old iron rails	$15.50 to 16.50
Old steel rails (under 3 ft.)	13.50 to 14.00
Relaying rails	23.00 to 25.00
Old steel boiler plate	10.50 to 11.00
Malleable iron (railroad)	13.50 to 14.00
Axle turnings	9.50 to 10.00
Steel axles	19.50 to 20.00
Malleable iron (agricultural)	11.50 to 12.00
Heavy steel	11.75 to 12.25
Country mixed steel	10.50 to 11.25
Bundled sheet scrap	9.00 to 9.50

Net Tons

No. 1 R. R. wrought	$12.00 to 12.50
No. 1 busheling	10.75 to 11.25
No. 1 machine cast	12.00 to 12.50
No. 1 dealers' wrought	9.50 to 10.00
Machine shop turnings	5.50 to 6.00
Pipes and flues	8.50 to 9.00
Wrought drillings	5.50 to 6.00
Cast borings	7.00 to 7.50
Stove plate	8.00 to 8.50
Wrought iron arch bars	17.00 to 17.50
Wrought iron piling plate	16.00 to 16.50

CHICAGO

(Delivered in consumers' yards.)

Gross Tons.

Old car wheels	$15.50 to 16.00
Old iron rails	16.00 to 16.50
Rerolling rails (5 ft. and over)	14.00 to 14.50
Old steel rails (3 ft. and und.)	12.75 to 13.25
Frogs, switches and guards	12.00 to 12.50
Heavy melting steel	12.00 to 12.50
Shoveling steel	11.75 to 12.25

Net Tons.

No. 1 R. R. wrought	$11.25 to 11.75
No. 2 R. R. wrought	10.75 to 11.25
Arch bars and transoms	15.50 to 16.00
Knuckles, couplers and springs	12.75 to 13.25
Shafting	16.00 to 16.50
Iron car axles	21.00 to 21.50
Steel car axles	18.25 to 18.75
Locomotive tires	13.50 to 14.00
Dealers' forge	10.75 to 11.25
Pipe and flues	8.25 to 8.75
No. 1 cast	12.75 to 13.25
No. 1 busheling	9.75 to 10.25
No. 2 busheling	7.25 to 7.75
No. 1 boiler cut	9.00 to 9.50
Boiler punchings	13.00 to 13.50
Cast and mixed borings	5.75 to 6.25
Machine shop turnings	6.00 to 6.50
Railroad malleable	13.00 to 13.50
Agricultural malleable	11.50 to 12.00
Angle bars, splices, etc., iron	15.25 to 15.75
Angle bars, steel	11.00 to 11.50
Stove plate and light cast scrap	10.75 to 11.25

NEW YORK

Gross tons, New York dealers' prices at tidewater, usually for Eastern Pennsylvania delivery:

Old car wheels	$11.50 to 12.00
Steel axles	15.75 to 16.00
Old steel shafting	14.50 to 14.75
No. 1 heavy melting steel	10.25 to 10.50
No. 1 R. R. wrought	13.00 to 13.50
Wrought pipe (not galvanized)	9.50 to 9.75
Cast borings	7.00 to 7.25
Machine shop turnings	7.00 to 7.25
Heavy cast	11.25 to 11.50

Stove plate	8.00 to 8.25
Grate bars	7.25 to 7.50

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York.

CINCINNATI

Gross Tons.

Old iron rails	$12.75 to 13.25
Old steel re-rolling	11.25 to 11.75
Old iron axles	17.25 to 17.75
Heavy melting scrap	10.75 to 11.25
Relaying rails	20.00 to 20.50
Bundled sheet scrap	8.25 to 8.75

Net Tons.

Old No. 1 R. R. wrought	$10.25 to 10.75
No. 1 yard wrought	8.00 to 8.50
No. 1 machine cast	10.50 to 11.00
No. 1 busheling	8.75 to 9.25
Stove plate	8.25 to 8.75
Machine shop turnings	6.25 to 6.75
Cast borings	6.00 to 6.50
Heavy turnings	6.50 to 7.00
Mixed cast	9.00 to 9.50
Breakage	6.75 to 7.25
Malleable	8.25 to 8.75

BIRMINGHAM

Old iron axles, (light)	$15.00 to 15.50
Old steel axles, (light)	15.00 to 15.50
Old iron rails	13.50 to 14.00
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	10.00 to 10.50
No. 1 steel scrap	10.50 to 11.00
Tram car wheels	10.50 to 11.00
Standard car wheels	12.00 to 12.50
Light cast and stove plate	8.50 to 9.00

BUFFALO

Heavy melting steel	$12.00 to 12.75
No. 1 R. R. wrought scrap	14.00 to 14.50
No. 1 R. R. and mch. cast scrap	13.75 to 14.25
Old steel axles	17.50 to 18.00
Car wheels	15.00 to 15.50
Railroad malleable scrap	13.25 to 13.75
Wr'ght iron and soft steel turn.	8.25 to 8.50
Cast iron borings	8.00 to 8.50
Low phos. steel scrap	17.00 to 17.50
Old iron rails	15.00 to 15.50
Boiler plate, sheared	15.00 to 15.50
Stove plate (net ton)	9.75 to 10.00
Locomotive grate bars	10.50 to 11.00
No. 1 busheling scrap	11.50 to 12.00
No. 2 busheling scrap	9.00 to 9.50

ST. LOUIS

(Dealers' buying prices.)

Gross Tons

Old car wheels	$14.00 to 14.50
Old iron rails	13.50 to 14.00
Rerol'g rails (5 ft. and over)	13.75 to 14.25
Old st'l rails (3 ft. and under)	13.50 to 13.75
Light section relayers (45 lbs. and under) subject to inspec.	23.50 to 24.50
Relay'g rails, subject to inspec.	23.50 to 24.50
Frogs, switches and guards	11.75 to 12.00
Heavy melting steel	11.75 to 12.00
Shoveling steel	10.25 to 10.50

Net Tons

No. 1 railroad wrought	$11.50 to 12.00
No. 2 railroad wrought	11.00 to 11.50
Arch bars and transoms	14.00 to 14.50
Knuckles, couplers, springs	10.00 to 10.50
Shafting	13.50 to 14.00
Iron car axles	21.00 to 21.50
Steel car axles	17.50 to 18.00
Locomotive tires	11.50 to 12.00
Pipe and flues	6.50 to 7.00
Tank iron and cut boilers	6.50 to 7.00
No. 1 cut busheling	9.50 to 10.00
No. 2 cut busheling	7.50 to 7.75
Cast and mixed borings	6.25 to 6.75
Machine shop turnings	7.25 to 7.75
R. R. malleable	10.50 to 11.00
Agricultural, malleable	9.00 to 9.50
Stove plates	8.00 to 8.25
Angle splice bars (steel)	11.50 to 11.75
Angle splice bars (iron)	12.50 to 13.00

Store Prices

CINCINNATI

Steel bars, 2.10c; iron bars, 2c; plates and shapes, 2.20c; sheets, blue annealed No. 10, 2.40c; black, No. 28, 2.85c; galvanized, No. 28, 3.95c; cold rolled shafting, round, 55 off; square, hexagon and flat, 50 off.

CLEVELAND

Steel bars, 2.10c; plates and shapes, 2.25c; iron bars, 2.05c; sheets, No. 10 blue annealed, 2.40c; No. 28 black, 2.85c; No. 28 galvanized, 3.95c.

CHICAGO

Steel bars, 1.95c; iron bars, 1.95c; hoops, 2.50c; shapes and plates, 2.05c; No. 10 blue annealed sheets, 2.25c; black, No. 28, 2.90c; galvanized, No. 28, 4.15c.

PHILADELPHIA

Steel bars 2.05c to 2.10c; structural shapes, 2.00c to 2.10c; plates, 2.00c to 2.10c.

NEW YORK

Steel bars, 2.05c; structural shapes, 2.15c; plates, 2.15c.

Sales Office Changes

The Lackawanna Steel Co.'s sales office at 202-212 Fidelity building, Buffalo, will be moved the last of the week to new quarters located at 904-6-8 in the new Marine National Bank building, where G. A. Hager, district sales manager, and C. H. McCullough, vice president and general manager, will have offices.

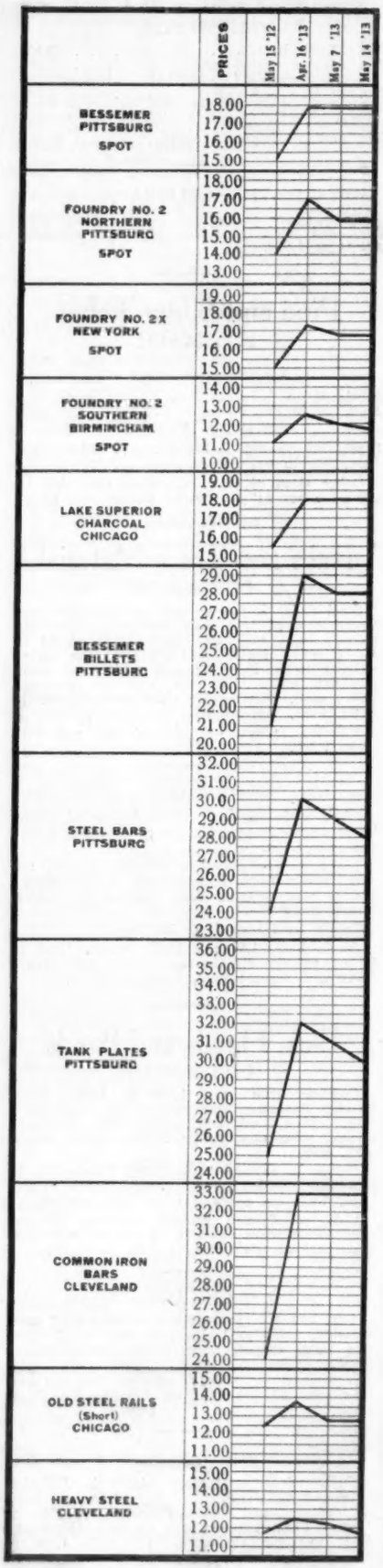
The Republic Iron & Steel Co. has moved its Buffalo office from 1007 White building to a larger suite at 901-3 in the same building, where M. E. Gregg, manager of sales for the district, is in better shape to handle the company's increasing business here.

The Cambria Steel Co., Johnstown, Pa., has opened a new sales office at Detroit, with L. H. Carlisle as district manager of sales. He was formerly identified with the New York office of the company. J. D. W. Snowden, formerly of Detroit, has been appointed assistant district sales manager of the company's Cleveland office. The Buffalo office has been closed and F. E. Allen, who was in charge of that branch, is now associated with the sales office at Johnstown.

Will Demand Higher Wages

Pittsburgh, May 14. (By wire.)—The United Sons of Vulcan in annual session in this city will ask a substantial increase in the puddling rate, according to an unofficial announcement this morning. Members are receiving $6 per ton, or 75 cents less than puddlers identified with the Amalgamated Association. The wage scale will not be discussed until the latter part of the week.

PRICE CHART



Quantity Production With Modern Gang Drills

How These Machines Are Employed for Performing the Various Drilling, Reaming, Facing, Tapping and Other Operations on Metal Parts

"Lathe", says Webster, is a word of uncertain origin, but there is nothing vague about its definition, which is as follows: "A machine for shaping articles, by cutting them with a tool while they are revolved." This is broad enough to include certain types of modern drill presses as well as ordinary lathes, but recent developments in machine tool practice indicate that the dictionary makers have made no error in this respect, for gang drills are now being used quite extensively to perform work that would ordinarily be handled on a chucking or turret lathe. Viewed from this aspect, the drill press is simply a vertical lathe, and in such a light appears not as a mere driller and borer of holes, but as a machine of elasticity and practical economy in manufacturing equipment.

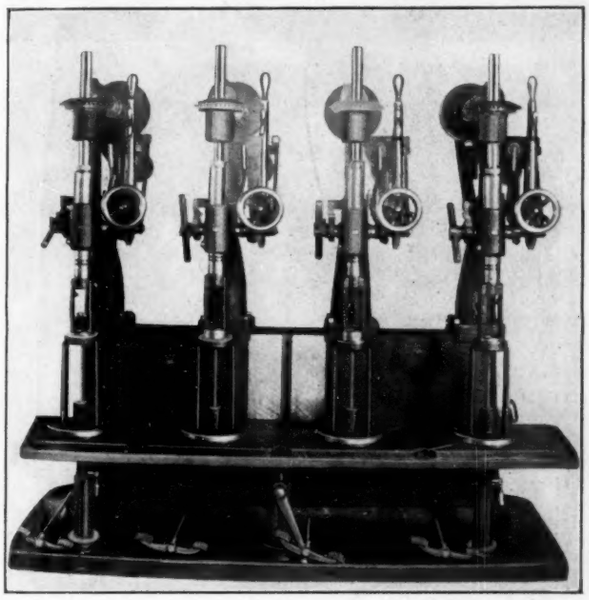


FIG. 1—DEEP DRILLING WITH INVERTED TOOLS

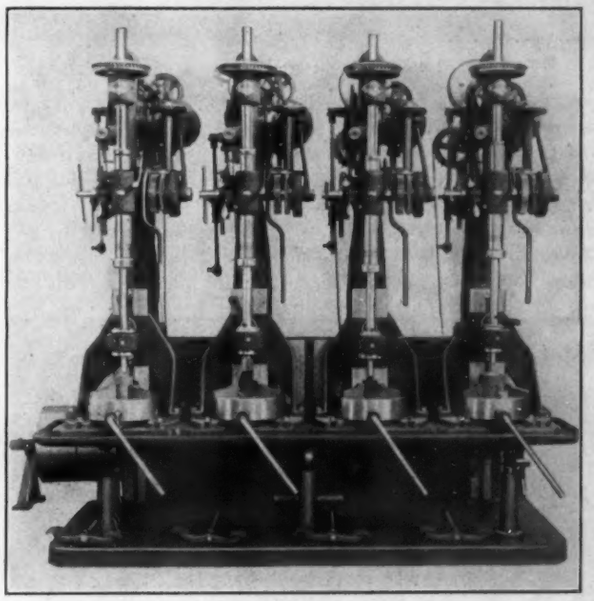


FIG. 2—FOUR-SPINDLE ROCKFORD GANG DRILL MAKING BUSHINGS

Gang drills for manufacturing parts in quantities by means of special jigs and fixtures are built in four different types for varying classes of work. Machines of the first type have a single table, from which the distance to the spindle is fixed. They are used largely where a number of jigs of approximately the same height are required. Gang drills with a single fixed table, but with the spindle bearings adjustable to various heights come in the second class and are employed on work where the jigs vary considerably in size, where a box jig of various rectangular dimensions is required or where the tooling is of different lengths. The third type has independent columns with adjustable tables and stationary spindle bearings, while in the fourth type both the tables and spindle bearings are adjustable. The former is used where the tables are required at different heights or work is to be clamped to the base, and the latter is employed on work of a similar nature where greater range of adjustment is desirable.

Gang drills are most successfully employed on parts where there is considerable deep drilling, boring, reaming, tapping, facing or cup turning to be done. A number of jobs involving operations of this character will be described in this article and for the illustrations and data we are indebted to the Rockford Drilling Machine Co., Rockford, Ill.

Drilling Deep Holes

In drilling deep holes, if the shape of the piece permits, it is generally most advantageous to chuck the work on the spindle of the drilling machine and feed it downward over an inverted tool as indicated in Fig. 1. Work such as that illustrated in Fig. 6, requiring boring, reaming and facing operations may be handled at one setting of the jig by the use of turret tool holders. In the case of bushings or sleeves where long holes are bored or reamed, Figs. 2 and 8, special provisions must be made to support the boring bars both above and below the work. Where several operations are required on the same piece, as in Fig. 4, time is saved if the work is moved from spindle to spindle on a simple stationary slide, but on jobs like those illustrated in Figs. 3 and 5, where holes have to be bored, reamed or tapped in cored castings, self-centering jigs are required which allow the work to properly adjust itself beneath the spindle.

Gang drill tooling is not economical unless the equipment is so arranged that the operators will have no spare time. Enough spindles should be provided to keep each man constantly busy and the secret of success lies in the proper jigging and tooling of the machine, gaging the number of spindles per operator to the time required for the longest operation and for the unloading and loading of pieces. For instance, on a boring operation taking three minutes followed by a reaming operation requiring only one minute, a four-spindle machine with three spindles boring

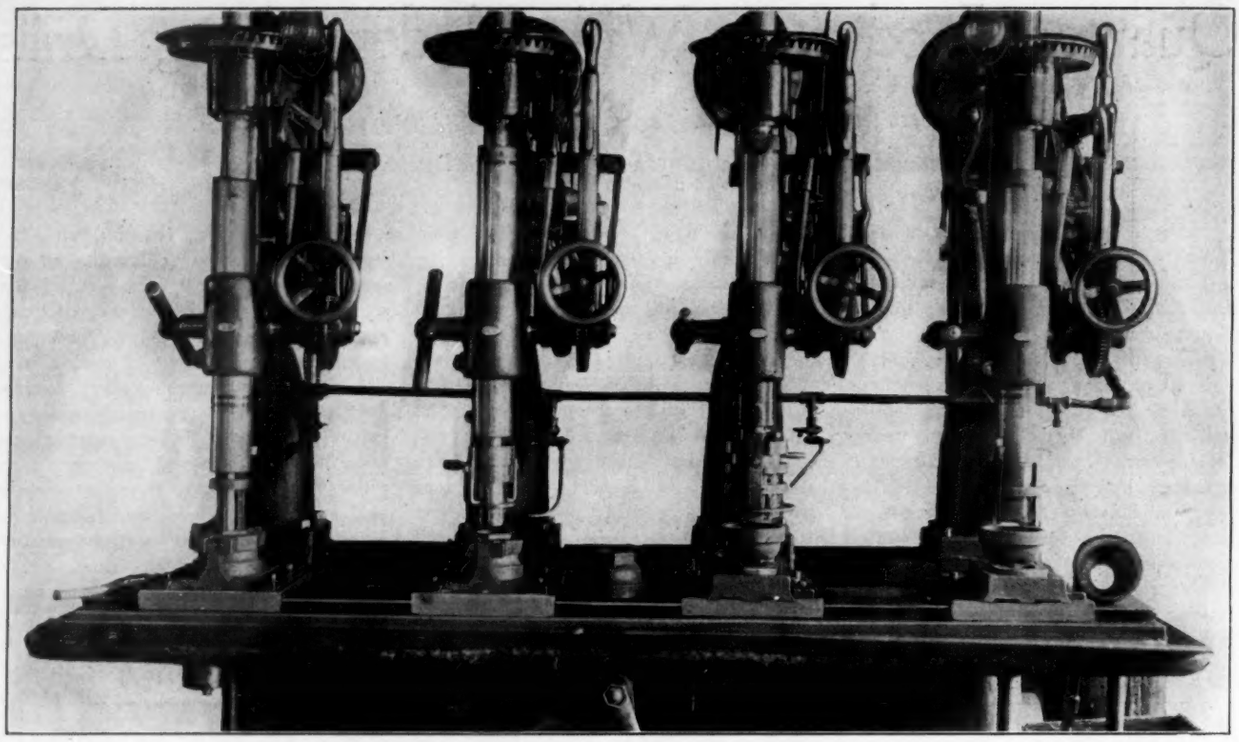


FIG. 3—GANG DRILL WITH COLLAPSIBLE TAPS FOR MACHINING PUMP CYLINDER

and one reaming would take care of the work without loss of time. The operator should be provided with plenty of jigs, and duplicate jigs for the same piece are often needed for maximum production.

In order to be sure that his operators do not waste their time, a certain prominent western manufacturer has his gang drills equipped with a cam which controls the motions of the spindle automatically. With this device and knowing the speed of the line shaft, it is easy to compute the number of cycles the machine makes in a day and the latter should equal the number of pieces finished, unless the operator is soldiering and allowing the machine to run idle.

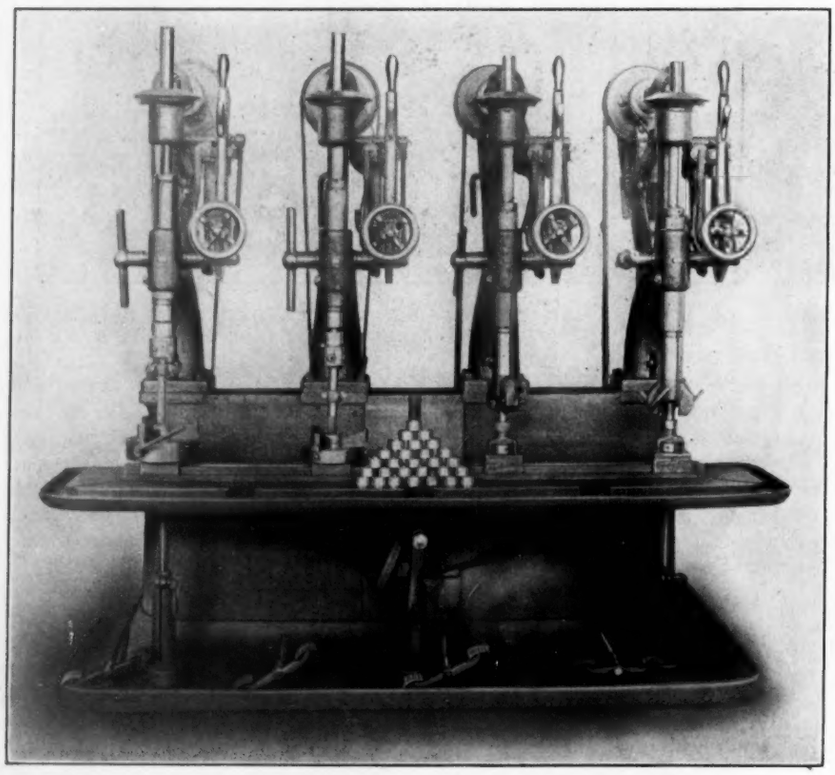


FIG. 4—GANG DRILL EQUIPPED FOR MANUFACTURING COLLARS

Fig. 1 shows a four-spindle, 23-inch gang drill tooled and jigged for drilling deep holes in steel bars. The holes are ⅞ inch in diameter, drilled 10 inches deep in cold rolled bars 1¼ inches in diameter and 12 inches long. If the piece were held in a chuck on a table and the drill inserted in the spindle, even if it were guided by a bushing, it would be difficult to drill to a depth of 10 inches and have the chips float freely to the surface. Hence the method of chucking the piece in the spindle and feeding it downward over the drill was adopted.

Chucks Fastened to Spindles

The chucks holding the work are fastened to the spindles and revolve freely with them. Four cast iron jigs are bolted to the table for supporting the drills and act as guides for the revolving chucks. The drills have a straight flute and are provided with oil tubes leading to the cutting edge. The oil is fed through the tubes by a pump under sufficient pressure to help force the chip away as fast as it is formed. The chip also falls by gravity, leaving the cutting edge free. A guide ring, not shown in the illustration, is fitted over the drill and up into the flange of the lower jig. This ring acts as a bushing to steady the drill while it is entering the work and is pushed downward and drops

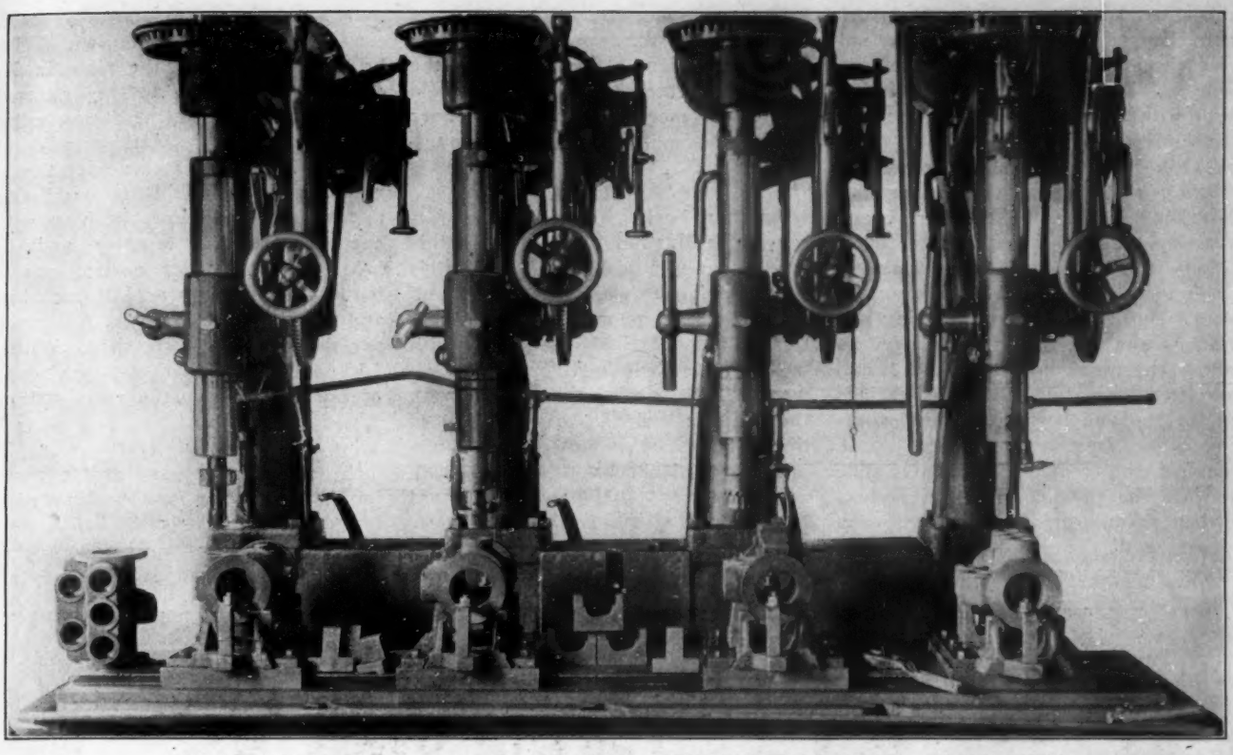


FIG. 5—PERFORMING 32 OPERATIONS ON A PUMP CYLINDER WITH A GANG DRILL

away as the spindle feeds the piece over the tool.

Another method of inverted drilling, including reaming, tapping or counterboring, is illustrated in Fig. 6. For this work a four-spindle, fully adjustable drilling machine is used. The work is such as would ordinarily be done on a turret lathe and each spindle is equipped with an adjustable collet chuck for handling short, straight pieces of round bar stock and a turret jig, fixed to the table, for holding the tools. The turret base is in one piece with an upright slide on which the clutch support is carried, making a unit which insures the correct alignment of spindle and tool independent of the spindle bearing. Each turret carries the requisite number of tools, in this case two, and is easily locked and unlocked by the handle, H, at the right of each jig. The turret is rotated by the two handles shown in the illustration. While three of the spindles are drilling the operator occupies his time reaming, tapping and rechucking, thereby utilizing the time necessary for the long drilling operation. The chip falls away by gravity, thus keeping the cutting edges of the tool at a proper temperature. Machines of this type are used quite extensively in the manufacture of small automobile parts.

A particular difficult operation performed accurately on a gang drill by a handy man drawing a laborer's wages is shown in Fig. 8. The work consists in turning, facing the ends, boring and reaming the sleeves or quills of drill presses. The right hand spindle is equipped with a suitable head mounted on a vertical slide directly in front of the column. The head is carried on the nose of the spindle but is counterweighted independently, as shown at *W*. A tailstock is also mounted on the vertical slide in order to accommodate different lengths of sleeves. The work is driven by two three-cornered, knife-edge centers which fit into the cored hole, thus chucking and centering by

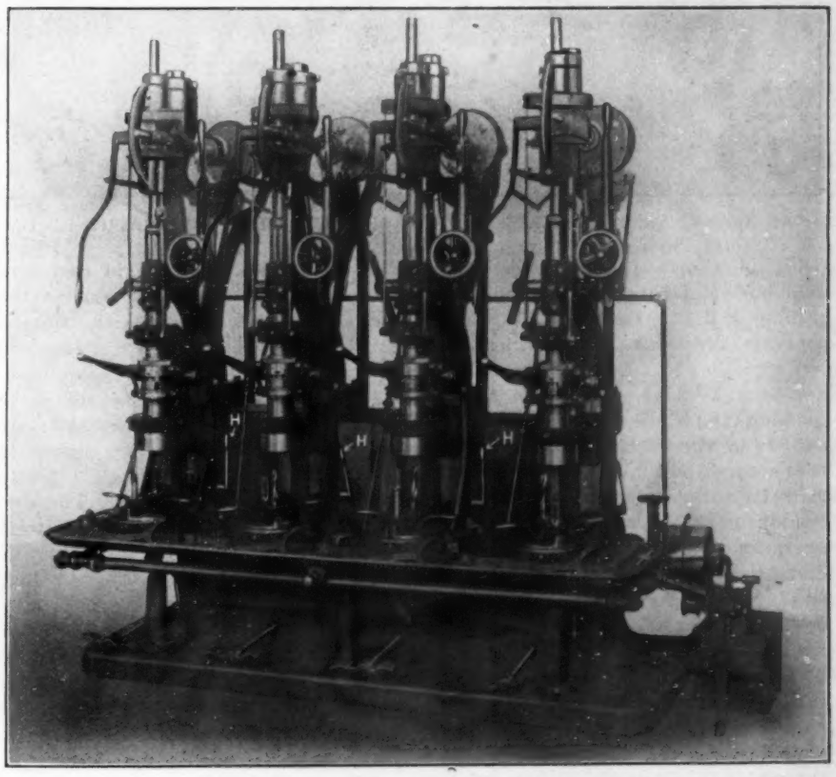


FIG. 6—GANG DRILL EQUIPPED WITH TURRET TOOL-HOLDERS FOR DRILLING, TAPPING AND REAMING OPERATIONS

the core. An arm encircling the work and clamped to the vertical slide carries three tools which turn the outside of the sleeve, while a fourth tool with a hand feed is used to face the ends.

While the right hand spindle is turning and facing, the center and left hand spindles do the boring and reaming. The jig for the latter operations consists of a frame carrying an upper and lower three-jaw universal chuck, the lower one being stationary and the upper one hinged to allow the work to be removed and admitted quickly. Bushed bearings at the top and bottom guide the boring bars. In changing pieces or in affixing the reamer, the bars slide up into the spindle. Two boring cuts and a reamer are run through each sleeve and the right hand spindle easily keeps the other two busy.

Boring, Reaming and Facing

Another boring, reaming and facing job is illustrated in Fig. 2. In this case a four-spindle 23-inch gang drill is used for boring, facing one end and reaming bushings ranging from 15/16 to 2 7/16 inches inside diameter, with from ⅛ to 3/16-inch metal to remove. The bushings are cast with the holes cored. Upon the table of the machine are mounted four three-jaw universal chucks, the key to each of which is supported by an outboard bearing and attached to a steel lever bent at right angles for conveniently and rapidly changing pieces. Straddling each chuck is a rigid cast iron arm clamped to the table and to the face of the column. Each arm is fitted with two bushings, one fastened to it and the other turning freely inside. The boring bar is keyed to the inside bushing, in which two slots are cut at diametrically opposite points to permit the boring and facing tools to pass through with the bar. The cutters are never removed except for sharpening. The reamers are made to go on the lower end of the boring bar with a taper fit and have suitable locks for driving. They are so constructed that they can be slipped onto the bar without stopping the spindle and are knocked-off by the back of the reamer striking the bushing as the spindle is withdrawn.

The operator chucks his work under the four spindles successively and loads and takes the partly finished collar to the third or fourth spindle for completion. After starting the cutter, he returns to the first spindle in time to meet the roughing reamer getting through with its operation.

Fig. 4 shows a four-spindle gang drill boring, facing, reaming and cup-turning collars. Each spindle has its separate operation. Starting at the left, spindle No. 1 does the boring and rough-facing, No. 2 does the reaming and finish-facing and Nos. 3 and 4 do the turning and facing on the second end. Where great accuracy is not required, the fourth operation could be omitted. For the operations under the first two spindles, three-jaw universal chucks are employed to hold the work, while under spindles No. 3 and No. 4, the work is held on expanding arbors. The jigs work in pairs and are mutually interchangeable. While No. 1 spindle is doing the boring with a roughing reamer, the operator slides the second jig under spindle No. 2 and reams the faces. He then reloads and takes the partly finished collar to the third or fourth spindle for completion. After starting the cutter, he returns to the first spindle in time to meet the roughing reamer getting through with its operation.

Fig. 3 shows a four-spindle, 23-inch heavy service gang drill equipped for facing, boring and tapping pump cylinder caps. The small end of each cap is hexagon shaped. The operations are performed progressively and the work is slid along from spindle to spindle on a self-centering jig. The latter has an adjustment lengthwise and crosswise, using two sets of sliding ways to the adjustment provided for the tool holder on an engine lathe. This jig allows the work to easily line up with the spindle and permits it to center itself. The cylinder cap is placed large end down in the jig under the first or left hand spindle, and the jig cover is closed down over it. The piece is held by a hexagon opening in the cover, which fits reasonably close over the hexagon end of the cap. After being bored, the piece goes to the second spindle, where it is tapped, collapsible taps being used. It is then screwed onto a taper plug under the fourth spindle, where the large diameter is bored and faced. The jig is

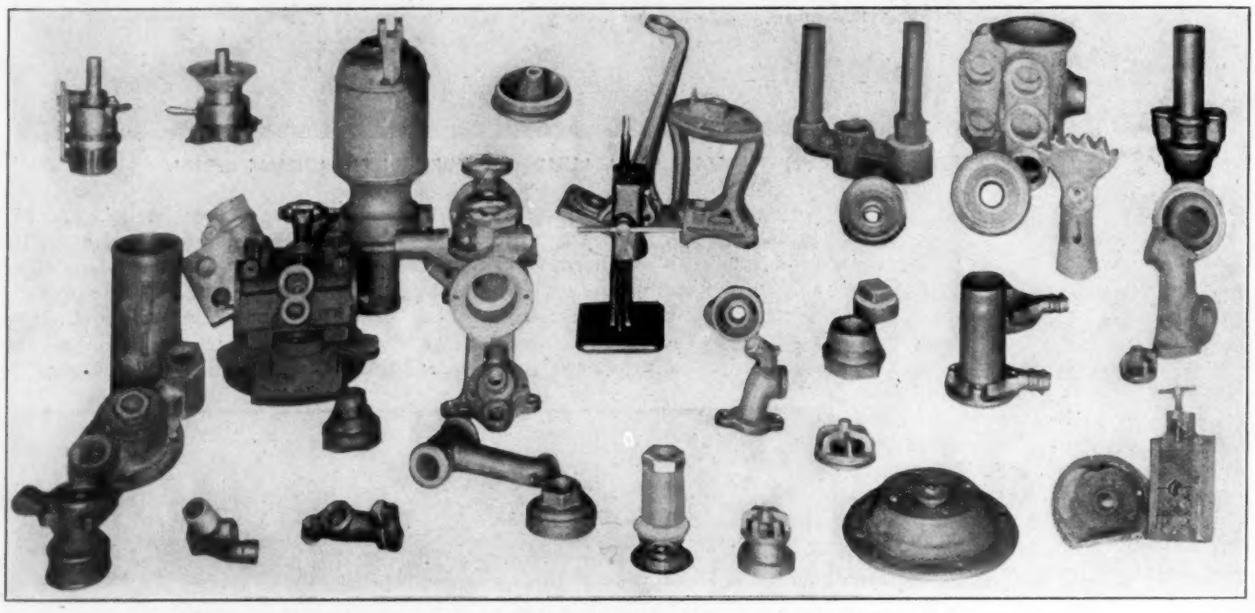


FIG. 7—A NUMBER OF PUMP PARTS MACHINED ON GANG DRILLS

finally slid back to the third spindle, where the large diameter is threaded with a collapsible tap.

When the four spindles are working, these operations follow each other in rapid succession, the workman tapping both the small and large diameters at the same time by pulling down both tapping levers simultaneously. The production is said to be 400 a day on a cap with a diameter of 5 inches on the large end and 1¼ inches on the small end. On smaller work the production runs up to to 500 or 600 per day on one machine with one operator.

Machining a Pump Cylinder

A pump cylinder casting at the plant of the Trahern Pump Co., Rockford, Ill., on which 32 operations are performed is shown in Fig. 5. The work requires two men, one for setting up the jigs and the other for handling the different spindles. The operations consist of boring, facing and tapping. In each case where the holes have to be faced after being bored, the spindle is equipped with a combined boring and facing tool of high speed steel as shown on the third spindle. The power feed is so set that it automatically trips with the facing cutter immediately above the work and a few sweeps of the facing tool completes the operation. On holes above 1 inch in diameter, a collapsible tap is used. Each piece requires three settings. An interchangeable jig plate similar to the one shown in Fig. 3 is used, so that the piece can be quickly shifted from the boring to the tapping spindle. In the various re-settings of the jig, different supporting blocks are required. Some of these blocks are shown on the table of the machine between the first three spindles in Fig. 5. The jigs are arranged so that the holes are kept in a proper relation to each other and the finished pieces are perfectly interchangeable. One operator with a helper completes 70 cylinders a day in 10 hours, a total of 2,240 operations, or 224 operations per hour.

Herman Bacharach, mechanical engineer, has removed from 722 Lewis block, Pittsburgh, into larger quarters in the Hartje building. Mr. Bacharach has increased his line of industrial instruments and now is handling, in addition to recording steam and gas apparatus, smoke and dust recorders, specific gravity meters for gas and liquids, carbon dioxide recorders, engine indicators, etc.

Record Crucible Furnace Run

Furnace No. 2, in the crucible steel plant of the Columbia Tool Steel Co., Chicago Heights, Ill., it is believed, has broken the record for continuous operations of melting mediums of this type. The first heat was made July 13, 1909, and six heats a day, except Sundays and holidays, have been made regularly to April 24, this year, a period of 3 years, 9 months and 11 days. During that time this furnace melted 6,290 heats, refining 9,435 tons of tool steel. This plant contains two 30-pot crucible furnaces in charge of W. J. Mathews, melter. Notwithstanding this continuous run, the furnace is not in bad condition, although several new tops have been added, due to the wear resulting from dragging the pots over the top course of bricks, and on January 18, this year, a new middle wall was built. However, no other repairs have been made.

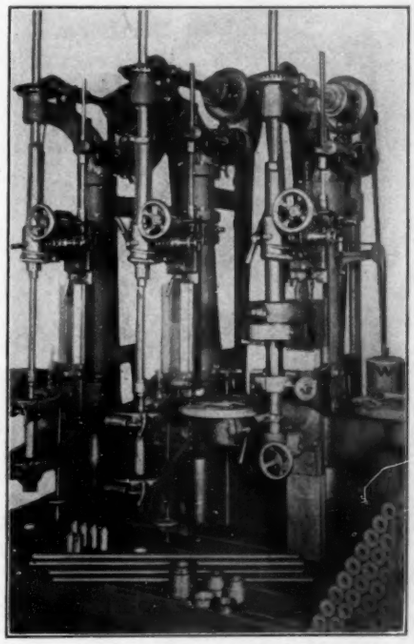


FIG. 8—JIG AND TOOL EQUIPMENT FOR TURNING AND BORING SPINDLES

In design and construction, these furnaces differ somewhat from those employed in the Pittsburgh district. Owing to the recurrent spring floods, the crucible furnaces in that section have been built largely above the ground out of reach of high water. The furnaces in the plant of the Columbia Tool Steel Co., on the other hand, are built almost entirely in the ground and the melting floor is only 31 inches above the level of the plant. This type of construction undoubtedly insures a more uniform heat throughout the furnace mass and expansion and contraction arising from the cooling of the exterior is reduced to the minimum. These furnaces were built on a foundation of concrete, 12 inches thick, which eliminated any danger from settling. The partition walls between the gas and air tunnels are 18 inches thick, thereby preventing leakage, although these tunnels generally are only 12 inches in thickness. Throughout this period, the fire brick was almost continuously subjected to a temperature of 3,000 degrees Fahr. When this type of furnace was first introduced in the United States, a run of four or five weeks was considered satisfactory, and when this was increased to four or five months, the record was phenomenal.

Texas Iron Ore Developments

The East Texas Brown Ore Development Co., with headquarters at Galveston, is continuing the development of its property in northeastern Texas. The deposits are located near Marshall, Texas, southwest of Texarkana, Ark. A railroad about 30 miles long has been built from the mine to a connection with the Santa Fe near Marshall. The ore is a limonite and hematite and will be easily accessible by steam shovel, the stripping varying from six inches to 30 feet. It is understood that contracts have been made with eastern furnaces to ship an ore running 55 per cent iron, 0.09 per cent or under in phosphorus, with a trace of sulphur and high in silicon. It is said that about 200,000,000 tons have already been surveyed and it is believed that the entire district will eventually be found to contain over 1,000,000,000 tons of merchantable ore.

The ore will be hauled over the Santa Fe to Galveston, a distance of about 300 miles. At the latter port the railroad company has built an ore dock at an expense of about $60,000. Also, steamers which are now in the sugar and banana trade, have been chartered to carry the ore around to the Atlantic coast ports.

E. D. Morton & Co., Louisville, dealers in mill supplies, machine tools, steam specialties and power plant equipment, have issued their 1913 catalog, which contains 757 pages and is published in two forms, one in a durable red cloth, and the other in loose-leaf style, flexible leather cover, with blank inserts for price notations. The lines of machinery shown include the Webster Mfg. Co.'s conveyors and elevators; Valley Iron Works hangers and shafting; C. A. Claflin & Co.'s hose fittings and boiler tube cleaners; Homestead valves, and others.

The Use of Blast Furnace Gas as Engine Fuel[1]

Operations Discussed from the Practical Side With Data on the Design and Construction of Gas Cleaners, Holders, etc., and the Value of Recording Instruments and Log Records

By Charles C Sampson

The question of the operation of gas engines using blast furnace gas as fuel includes several important factors outside the actual operation of the engines themselves. It will, therefore, be aside from the present purpose to do more than state that the usual blast furnace gas has the following composition:

	Per cent.
Carbon monoxide	23
Carbon dioxide	12
Hydrogen	2
Methane	2
Vapor of water	3
Nitrogen	58

The calorific or heating value is about 900 calories per cubic meter, and gives a consumption of 3 cubic meters per indicated horsepower in the engine.

Cleaning the Gas

One of the most important of these factors and one which delayed the general use of these engines many years is the cleaning of the gas. As delivered by the furnaces to the downcomer the gas contains normally from 3 to 10 grains of dust per cubic foot of dry gas, but at times of slips or other sudden changes in the furnace, it carries much more. For use in engines the gas must be cleaned to 0.02 grains of dust to satisfy the requirements of the engine builders, but even this figure is too high to satisfy the operating engineer, since it is possible to clean the gas to 0.005 or 0.006 grains per cubic foot with great benefit to the engines.

The method of cleaning largely used at present has three stages: Dry cleaning to 1½ to 2 grains per cubic foot which is always done by the blast furnace department; primary washing in static washers to about 0.15 grains per cubic foot, and dynamic or mechanical cleaning in highly developed machines to 0.015 or less. The last stages are usually handled by the gas engine departments, though as the furnace men realize more and more that a cleanliness of 0.2 grains per cubic foot or less is of great benefit to the stoves and boilers they will take over the second stage, leaving only the final cleaning for the gas engine department.

The dry cleaning is done in dry dust catchers, the standard design being a large diameter, vertical, cylindrical shell into which the gas enters tangentially near the top and leaves through a vertical outlet pipe which extends about two-thirds down from the top. These dust catchers remove the heavier particles of dust, but their efficiency is only about 80 per cent as they pick up, or perhaps do not drop, the finer dust which is carried on by the upward current of gas to the outlet.

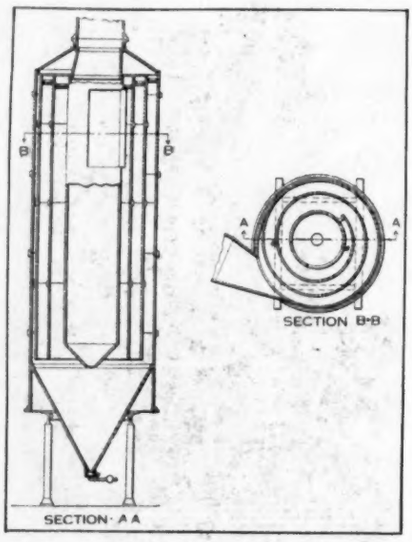


FIG. 1—CENTRIFUGAL DUST CATCHER

The refinement of design in dry cleaners has advanced materially in the past three or four years, as shown in the modern apparatus resulting from the careful study of the problem. One of the latest of these is the centrifugal dust catcher shown in Fig. 1. This device makes use of the centrifugal separation of dust from the gas as it passes inward through a cylindrical spiral opening into a dust basin at the bottom. The gas enters at the top of the outside, leaves at the top of the inner end of the spiral and passes upward through an extension of the pipe around which it is wrapped. The gas passes free of all obstructions at the upper end of the spiral while the dust separated drops to the bottom through the open end. There is no tendency for the gas to pick up the separated dust and carry it out as is the case in the older types of dry cleaners.

It is frequently found that sudden changes in the direction of flow of the gas, as at water seals or other necessary bends in the pipe, are quite efficient in the removal of the dust. In one case, gas carrying about 5 grains per cubic foot passed through four sharp bends and gave all dust, but about 2 grains per cubic foot. For this reason every part of the dry gas main where such bends are necessary can be made to assist materially in the cleaning of the gas, if pockets are added equipped with valves so that the dust can be conveniently removed.

Dust Pockets

Where long gas mains are necessary they can be made to add to the cleaning of the gas by building them in successive lengths with sufficient rise and fall to allow the dust to settle in pockets at the bottom angles for cleaning. If the gas for any reason moves slowly in a long main the loss of heat through the pipe will probably reduce the temperature below the dew point and thus condense some of the moisture carried with the gas from the furnace and cause the deposit of wet dust which adds greatly to the cleaning plant labor. This is especially apt to occur where two or more groups of furnaces supply one washing plant; the gas from the one with the lower top pressure will move slowly or even reverse its direction of flow at times, allowing excessive cooling and the resulting condensation. This condensation will begin when the temperature is reduced to 115 to 120 degrees Fahr. and will, of course, give more trouble in winter when the condensed moisture will freeze in the dust valves and drips and requires continual thawing to allow its removal.

It is possible to keep the gas mains clean without taking them out of service if they are equipped with sufficient openings to allow every part of the pipe to be reached with a stream from a high-pressure water system, and with valves or doors at all low points for the removal of the mud washed down. The mains near the furnace do not need this

[1]From the Transactions of the American Society of Mechanical Engineers.

equipment as they can easily be designed to make them entirely self-cleaning, while it is quite necessary that long mains where condensation may occur be so equipped.

Gas Washers

The present primary washers (the first stage of wet cleaning) are of the static scrubber type and include all those in which the gas passes through a stationary shell without moving parts, the water for washing being supplied either in spray or sheets. The spray and hurdle, Mullen, baffle, and rain type scrubbers come under this classification.

The spray and hurdle system is preferred on account of its better distribution of water, and since it is self-cleaning it needs inspection only after long periods of operation. Several of these scrubbers have been opened after from one to three years' service and in every case have been found perfectly clean and required no repairs whatever before being returned to service. The wood was in good condition as it is continually wet and oxygen does not have access to it to start decay. In the rain or baffle types the gas is more apt to channel and travel up one side of the scrubber and the water down the other.

It is important to secure uniform distribution of the gas as well as of the water in any scrubber. For the inlet a cone about two-thirds the diameter of the shell with a cone-shaped ring below it open in the center about one-half the diameter of the shell will give good distribution. These should both slope about 45 degrees to keep the mud from remaining on them.

Two outlets at opposite sides of the top are better than one on account of the deflection of the water by the gas currents if only one is used. This is particularly true if the water is sprayed by falling on spray plates as the gas current may then be strong enough to blow the water clear of the plate and thus entirely lose its effect. Spray nozzles are not subject to this fault, but are not able to handle water that has much dirt in it without a great amount of attention.

Scrubber Bottom

In designing the scrubber bottom, its foundation and the basin and overflow for the outlet water, it must be remembered that while the usual working pressure will be from 6 to 18 inches of water, a slip will give pressures of from 40 to 50 inches for a short time. A normal head of water of 36 inches from the bottom of the scrubber to the water overflow level with the basin walls 24 inches above this and an emergency overflow 4 inches below the top of the basin walls will care for slip pressure without blowing out any gas or overflowing the basin into the yard. The bottom of the basin wall will be self-cleaning if it has a steep slope and the outlet pipe is from the center of the bottom. The whole design of scrubber and basin must be examined to eliminate all places where mud can remain long enough to cake. Fig 2 shows this arrangement of scrubber bottom.

Should the water overflow pipe be stopped even for a short time the heavy mud will settle to the bottom of the basin and when the overflow pipe is cleaned there will be such a quantity that even the extra head of water to the emergency overflow will not force it out. For this reason the forming of heavy chunks must be prevented as much as possible and

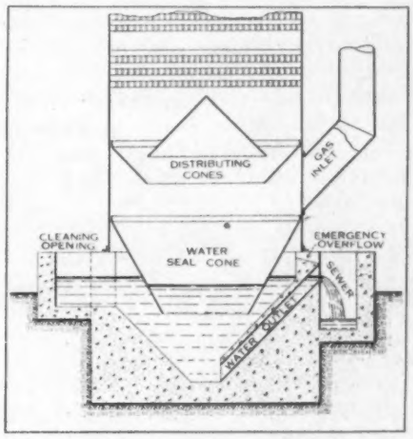


FIG. 2—SCRUBBER BOTTOM

provision must be made for stirring the basin water both with hoes or rakes and with a stream of water from the end of a pipe which can be thrust into all parts of it. It will be found convenient also to have the pipe bent at the end so that the stream can be directed up the overflow pipe to furnish additional head for starting the flow when necessary, or a special pipe with return bend and short nipple to thrust down the overflow pipe itself will surely be able to start the flow.

The final stage in cleaning is done with mechanical scrubbers or washers. These are highly developed and the Theisen patented gas washer has been in the lead for several years though other types are now being worked out, their builders claiming better results with less water and power consumption than the Theisen. The Theisen washers require about 3 per cent of the power plant output for their operation and from 16 to 18 gallons of water per 1,000 cubic feet of gas cleaned, which added to the 75 to 80 gallons required in the scrubbers makes the total from 90 to 100 gallons for the whole cleaning process. The newer apparatus, which are along the lines of the mechanical disintegrator, claim to use about 20 gallons of water per 1,000 cubic feet of gas for the whole cleaning process and to operate on less power than the Theisen washers.

Holders

In blast furnace gas engine plants the engines are entirely dependent upon the continuous supply of gas from the furnaces; a 100,000 cubic feet holder can only be considered a pressure regulator with capacity for enough gas to allow retiring in good order when the gas supply is cut off—for any reason. Thus, in a 1,000-kilowatt plant with such a holder the gas on hand would operate the plant only for about 25 to 30 minutes and should not be counted on for more than 15 to 20 minutes. This in an emergency would give time to notify the various departments using power and allow them time to prepare for a shut down.

The quantity of gas consumed by the engines is regulated by the governor to suit the power output, but since they must be supplied with gas at uniform pressure for satisfactory operation, it is necessary to regulate the gas supplied by some type of gasometer. This is best done by a gasometer of capacity such that the pressure fluctuations are not noticeable at the engines, and since it is well to have an emergency quantity of gas the gas holder itself will meet both demands at once if supplied with an efficient regulation valve. The holder will regulate the pressure perfectly between the maximum limit of the total quantity of gas that can be forced through the mains with the furnace pressure available assisted by the gas washers and the minimum limit of the leakage at the regulating valve.

Butterfly Valves

There should also be the possibility of regulating the gas quantity at the secondary washers since at times of very light loads the gas pressure between the holder and washer may blow out drip seals or cause dangerous gas leaks. This can be cared for by the installation of butterfly valves with quadrants either before or after the mechanical washers. The latter is to be preferred for then the

gas remains longer in the washers and receives additional cleaning.

A good regulating valve at the holder is of the butterfly type, attached by means of levers and cables to the holder bell so that it will remain wide open until the bell rises within a few feet of its upper position, and will close gradually until at the highest position it is completely closed. The arrangement shown in Fig. 3 works satisfactorily. The weight, *A*, must be heavy enough to

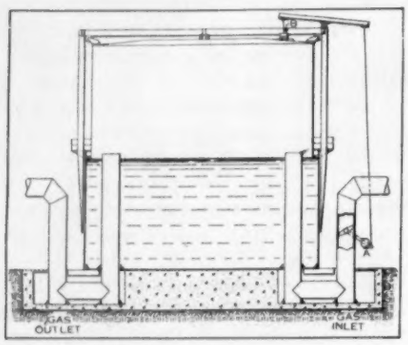


FIG. 3—ARRANGEMENT OF REGULATING VALVE FOR GAS HOLDER

close the valve, and the weight, *B*, must be heavy enough to open the valve and also lift the weight, *A*.

All exposed water lines must be protected from freezing. This is especially true of the supply to seals, drips from the gas main, and any line that does not have a continuous flow. With good water separators after the secondary cleaning apparatus, freezing weather or even 8 or 10 degrees Fahr. below zero, will not cause trouble in the gas mains themselves, though any valves which may be nearly closed or which are closed part of the time must be carefully protected. The butterfly valve for regulating the gas should be enclosed in a tight box with steam coils to keep it in working order. This also is true of the valves at the gas washing plant unless it is possible to install them within a heated building.

Warm Water in Gas Holder.

The water in the gas holder must also be warmed. The exhaust from the regulating valve coil will easily keep the holder water warm enough to prevent freezing except in the coldest weather (under 0 degrees Fahr.), when it is usually necessary to supply additional steam through several nozzles arranged to set up a circulation of the water around the tank. These should be well down in the water or ice will form on the lower part of the shell and build in toward the center and prevent the lowering of the bell.

During the time the holder water is warmed it is important frequently to observe its temperature, if too hot it will charge the gas with water so that condensation and freezing will take place in the gas engine supply pipes. When the water circulates properly in the holder, it is not necessary to have it any warmer than 38 or 40 degrees Fahr., while a rise to 65 or 70 degrees will give trouble.

If the gas holder is not visible from the gas washing plant, the operator needs a visible signal to give him its position, also an audible signal to inform him if it should lower beyond safe working position, the amount of the drop allowable before the audible signal operates being determined by the position of the regulating valve at the holder. The drop should be less than an amount to give a complete opening of the valve. The gas washer operator should have telephone connections with the engine room, besides the usual whistle or bell signals which are used to notify him of the starting or stopping of engines. He should also be in close touch with the blast furnace department in order that any change in the gas supply can be known in advance.

In all gas pipe lines, explosion doors are installed. These, as a rule, are useful only for access to the main for cleaning, usually being made of cast iron and hinged; on account of their weight and method of attachment the moment of inertia is so great that they will not open quickly enough to prevent the destruction of the main in which they are installed. Any gas main that will support itself over the span usually employed will easily stand any pressure that can be produced in the cleaning plant, and the use of these valves or other relief valves is not necessary. The inconvenience of escaping gas makes it advisable to design them as cleaning doors only, and to arrange them with a clamp fastening to avoid this inconvenience. If it is thought necessary to install explosion doors or valves I would suggest the use of sheets of light material arranged in frames so that they will be blown out should an explosion occur in the main.

The best protection from explosions is careful operation, especially to guard against a reduction of pressure of gas at the furnace side of the cleaning plant due to no air being drawn into the main at the stoves, and to see that no piece of apparatus is put in service with air trapped so it can be mixed with the gas and sent along to the engines.

Thermometers and pressure gages for indicating the temperature and pressure of the gas entering the cleaning plant, between the primary and secondary washers leaving the latter, and before and after the gas holder, form important parts of the gas cleaning system. The ordinary gas works thermometer with a stem reaching about 8 to 10 inches into the gas mains are to be located at each of the above points, while pressure gages of the U-tube type with inches of water as a measure of the pressure can be located in the gas washer building and connected to these points by ⅜ or ½-inch gas pipe. Recording gages should be used in connection with the indicating water column for the gas pressure at the entrance to the cleaning plant and in the gas main leading to the gas holder.

Log Records

The successful operation of the gas washing plant is advanced by the proper understanding of the meaning of the variation shown by these thermometers and gages. For this reason it is important to keep a record of these variations on carefully designed daily log sheets with at least eight daily notations. The gas washer operator soon learns to interpret the gage and thermometer changes, and will often foretell serious trouble by such understanding. For instance, the partial filling of a water seal is indicated some time before it will cause trouble by the swinging of the water in the U-tube, this movement being so markedly different from any other that he knows at once the trouble and from the location of the gage can easily tell which seal is filling.

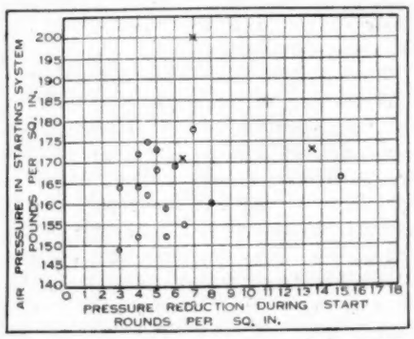


FIG. 4—RECORD OF PRESSURE DROP

The daily log sheets should have space reserved for the operator to note any unusual occurrence and the work done to keep the plant in condition. It should, in fact, be a complete report of each day's work to the engineer in charge, keeping him in close touch with the changing conditions in the gas cleaning system.

A second most important factor in

successful gas engine operation is good engine operators, and the same characteristics which are valuable in steam engine operators are valuable in the gas engine engineer.

Operation of Gas Engines

The operation of the engines themselves is exactly similar as far as the running gear is concerned and it is only the fact that the gas engineer is fireman as well as engineer that makes it necessary that he be more alert and watchful. Economical operation of gas engines on the same account requires that the engine operator must have his sense of the *feel of the machine* well developed.

Compressed air at from 150 to 200 pounds per square inch pressure has proved satisfactory for starting gas engines and is especially desirable on account of the ease with which a suitable quantity can be stored under pressure ready for use at any time.

In a starting system of 2,000 cubic feet capacity the air pressure is lowered about 20 pounds in starting one 3,000-kilowatt twin-tandem unit, and since 150 pounds pressure is sufficient for a start there is a possibility of at least three starts from 200 pounds initial pressure, which is certainly sufficient to get under way even during the excitement of an emergency shut-down.

Record was kept of the pressure drop in starting an 1,800-horsepower twin-tandem Allis-Chalmers engine from an air system having two tanks of 1,100 cubic feet capacity each. This record included 19 starts, 16 using the full capacity of the system and three

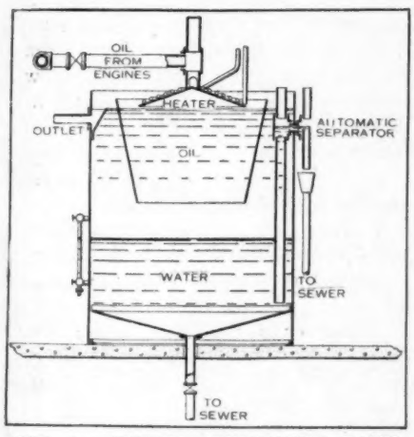


FIG. 5 — WATER SEPARATING TANK FOR OIL CLEANING SYSTEM

with one tank out of service. This record is plotted in Fig. 4, the pressure in the system being shown as ordinates and the pressure drop as abscissae; the 16 starts with complete air system in use are indicated by circles and the three that were made with one of the air tanks shut off, by crosses. It may be noted that the quantity of air required to start the engine was about the same, regardless of the pressure in the air tanks.

The necessary capacity of air tanks and air compressors for a given plant depends upon the number and size of engine units, and the frequency with which they may need to be started. After the engine operator becomes familiar with the operating peculiarities of the engines he should be able to start them at intervals of from 4 to 8 minutes and not lower the air pressure more than the compressor can make up in that time; if an engine lowers the pressure 8 pounds per square inch in a 2,000-cubic foot capacity system, the compressors should compress 8/15 of 2,000 = 1,060 cubic feet of free air in the maximum time allowable between starts or say 10 minutes. This would require two 106 cubic feet compressors.

Capacity of Air Compressors

For the ordinary blast furnace gas engine plant of from three to six engines two air compressors of 100 cubic feet capacity and air tank capacity of 2,000 cubic feet are quite sufficient, while for more than six engines the compressor capacity should be increased rather than the tank volume. At least one of the compressors must derive its power from some source outside of the gas engine in order to be able to start the plant if all units should be down.

It is important to keep the water jackets thoroughly clean and the item of jacket cleaning should appear regularly in the engine operation schedule. This cleaning requires careful attention, since, with the class of labor usually put on this work, it will be slighted in the places where the most care is needed.

The question of lubrication is one of so many variations I can only say that for general lubrication of such as main bearings, crosshead and crank pins and crosshead slides where the rubbing surfaces are at room temperature, an oil of the following physical characteristics has given excellent service:

Specific gravity	888
Viscosity (Tagliabue), at 70 deg. Fahr.	210
Cold test, deg. Fahr.	35
Flash temperature	435

This service also includes satisfactory separation of water and dirt by settling and filtration. On account of the almost certain mixing of water from the cooling system with the oil system, it is necessary to provide means of separating the water and oil in the filtration process and it can be done thoroughly only by heating the oil to about 160 or 190 degrees Fahr. and giving it time in a quiet condition to allow the separation. A large part of the dirt will settle with the water. Such that does not, must be removed by filtration through fine cloth either of organic fiber or of fine wire.

A good oil-cleaning system giving excellent satisfaction consists of one 1,500-gallon water-separating tank, shown in Fig. 5, with a heating coil

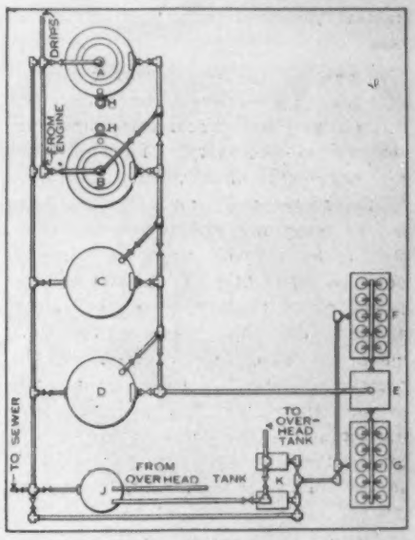


FIG. 6—OIL CLEANING SYSTEM

over which the oil flows as it enters on returning from the engines, and an adjustable automatic water overflow to discharge the separated water, two settling tanks of the same size through which the oil passes in tandem to allow time for quiet settling of dirt particles, and a filter unit with 20 filter bags, 10 each in two filter tanks.

An extra tank is used when either of the other three is out of service for cleaning. An auxiliary tank of about 200 gallons capacity is used for boiling the sludge taken from either of the large tanks or the filters at time of cleaning as well as such dirty oil as can be drawn off daily from the bottom of the overhead oil tank.

Oil Cleaning by Steam

This system is shown in Fig. 6. The oil from the engine drips enters tank, *A*, over the steam coil, flows down through the inner cone, then up and out the overflow to *C* and *D*, thence to the filters, *F* and *G*, through *E*, which is also a water separator. The clean oil is pumped from the filters by one of the pumps at *K*, which are in duplicate, to the overhead engine supply tank in which the quantity of oil on hand is shown by an index on a large gage visible from the engine room floor. Gage

glasses on each tank show the level of the line between the oil and water, both as an operating convenience and as a means of checking the quantity of oil used during the month. The separated water flows down the inside of the cone in *A* to the bottom of the tank, from which it flows through the automatic overflow, *H*. The nipple in the tee at *H* is adjustable so that the water in *A* can be held at the level found best in operation.

A part of the dirt is oil-coated so that it floats between the water and the oil and will accumulate until its removal is necessary. The oil from the engines is then turned into tank *B*, the supply to *C* and *D* being kept up by stopping the water overflow and filling *A* with water as long as good oil flows out. The water is then drawn off to the sewer and the sludge pumped into the boiling tank, *J*, where as much oil is reclaimed as possible. The other tanks are cleaned in the same way. There are pipe connections from the bottom of all tanks to one of the pumps, also from the discharge of this pump to the tank *J*.

Such an oil system will keep the oil clean for a plant circulating 500 to 600 gallons per hour. Of course some oil is lost through leakage at the engines, and some is wiped up in keeping the engines clean, but the addition of new oil need not amount to more than 100 gallons per month. In blowing engine plants where the engine oil is drawn into the blowing cylinders from mechanically operated valves the oil consumption will not be so low unless good oil separators are installed in the cold blast mains arranged to discharge this oil back into the oil system.

The cylinder oil question is also one of many opinions. The varying cleanliness of the gas, hardness of cylinder walls and piston rings, piston speeds, mean effective and maximum pressures all have their influence on the action of the cylinder oil. An oil showing a specific gravity of 0.902; viscosity (Tagliabue) of 78 at 212 degrees Fahr., and a flash temperature of 380, gave excellent results in a gas blowing engine plant where the dust was low (0.01 or less) and piston speeds less than 600 feet per minute, and was not satisfactory in another, with 0.012 dust and piston speeds of 850 feet per minute. In the latter case the oil was replaced by one of specific gravity, 0.920; viscosity, 203 at 212 degrees Fahr., and flash temperature, 502, and immediate improvement was shown.

With the lighter oil the cylinders were not dry in any part though they did show more wear than was expected for the time in service, the machining marks in the bore being almost invisible after three months' operation.

The mechanically-operated igniter is to be preferred to the magnetic type. The current supply should be from a source not liable to fluctuation, such as that from a motor generator set that supplies current to the ignition system alone and arranged in connection with a storage battery so that should anything happen to the motor generators the battery would take up the load, automatically signaling the operator. The location of the ignition plugs is important, since an explosion on one side only of the piston will force it to the other side and cause it to strike the cylinder wall. This is easily apparent in cylinders having the combustion chamber at the side and the effect of one-sided explosions can be seen when one of three equally spaced igniters is not working.

Premature Ignition

Premature ignition is usually caused by excess hydrogen in the gas, and will occur when the quantity of hydrogen reaches 4.6 per cent, depending also upon the cleanliness of the cylinders. This prematuring is one of the first indications of leaking cooling plates in the furnace and the gas engine operator will often be able to inform the furnaces of this condition before they learn of it themselves. When a furnace has the wind off for casting, the water pressure in the cooling plates is greater than the furnace pressure and the water enters the furnace and is immediately dissociated, the oxygen being consumed by the coke leaves the excess hydrogen in the gas. When the wind is put on again this gas, rich in hydrogen, is sent along to the engine, causing prematuring.

The pistons of the first large gas engines were cast iron, but these gave considerable trouble by cracking because they were not properly ribbed. Several builders changed to cast steel, but found they gave trouble either by cutting the cylinder walls or by beading over and binding the rings. Cast iron was again resorted to with an improved design. In the cast steel pistons also, the movement of the rings widens the grooves so that in a short time there is too much clearance which necessitates turning the grooves and making new rings.

Cast iron snap rings of uniform cross-section give better service than any other type. This has been learned after many atempts to design a complicated ring, the designer believing a ring to hold gas engine pressure would be more difficult to make than one for steam engine pressure.

Piston rod packing furnishes one of the difficult problems for the designer and also for the engine operator. A good packing must be simple in design and, as in the case with the piston rings, the forms with the fewest parts seem to give the best service. Both cast iron and babbitt have given good results. The success or failure of this part of the engine depends largely upon its cleanliness and too much care cannot be used in assembling it to insure its proper application.

The engine room basement has not received the attention it deserves. Two items the designer of any power plant will do well to consider; make the engine room floor high enough over the basement floor to allow 6 feet clear under all suspended pipes, and have the basement floor slope enough for rapid drainage (at least 12 inches for 100 feet). A dry basement with plenty of head room is easily kept clean and a clean basement is a great help in keeping the whole room in good condition. Ventilation and lighting are also more easily accomplished in a high basement.

The question of safety of the employe in all occupations is at present a live one and is to be considered in the engine room as well as in the rolling mill. Safety demands the elimination of all dangerous conditions by covering gears, guarding flywheels, generators and crossheads, enclosing electrical apparatus and keeping all gas pipes tight and free from leaks. The men must be trained to watch out for their own and their fellow workmen's safety. It is just as important that the lives and limbs of the engine crew be protected as it is that the cost of electricity should be low.

A daily log of the various pressures and temperatures must be kept to learn whether the plant conditions are changing and to know the cause of these changes. Any unusual occurrence or the regular recurrence of repairs noted on the log sheets puts the information regarding the plant where it can be used in predicting and preparing for the future. Not only should this information be kept daily but it should be collected and averaged monthly and yearly for the comparisons of month with month and year with year. Much of the engineering information is best shown graphically, for a sheet full of figures does not give a true conception of the actual conditions.

An Oscillating Burnishing Barrel

To meet the demand for a burnishing barrel for articles more than 16 inches long, the Abbott Ball Co., Hartford, Conn., is now building a machine of the oscillating type, the inside diameter of the barrel is 12 inches and the length is 30 inches. The barrel is octagonal in form, lined with hard maple, and mounted on trunnions in a yoke, the sides of which are made of steel channels. A locking device slides in a slot in these channels, as illustrated in Fig. 3. In the horizontal position, Fig. 1, the barrel is locked by a slot in a sliding lock member, which engages the lug cast onto the side of the barrel. In the position shown in Fig. 2, the barrel is locked by teeth in the opposite end of the sliding lock, which engage corresponding teeth on the outside of the trunnion bearing on the barrel. When the locking mechanism is disengaged, the barrel can be rolled over on the main bearing for dumping its contents, as shown in Fig. 3. The barrel can be locked in position at different angles and this imparts an oscillating movement to the contents. The angle at which the barrel should be set is determined by the character of the work to be finished.

When burnishing metal parts, the barrel should be filled almost entirely with these parts and balls, soap chips and water being employed as usual. By filling the barrel in this way the metal parts are prevented from turning on end while the barrel is being rotated.

Uranium and Vanadium Ores

According to the geological survey, the shipment of uranium and vanadium ores in the United States in 1912 was in the hands of about a dozen persons and firms. These ores come from Colorado and Utah. The production of uranium in 1912 was about 26 tons of oxide, which is equivalent to 22 tons of the metallic element, as against 25 tons of oxide produced in 1911, which, when reduced, would yield approximately 22.2 tons of metal. The vanadium output for 1912 was a little less than 300 tons of metal.

The price has varied between 25 and 30 cents a pound, for the contained vanadium oxide, while the uranium oxide content of the ore has commanded from $1.30 to $1.50 a pound where the ore exceeded 2½ per cent of oxide.

Yale & Towne Mfg. Co.'s Office Building

The Yale & Towne Mfg. Co. has removed its general offices from 9 Murray street to 9 East Fortieth street, New York City. The new quarters were selected after long investigation as being best suited to the convenience of customers and to promote the efficiency of the management. The building is located half way between the great railroad terminals, in the heart of the hotel district and is accessible from all sections of the city. The site is 50 x 100 feet, and the 12-story building was erected and is owned by the company. The ground floor is devoted to a series of exhibit rooms. The basement contains the city salesroom and the repair department, while the twelfth floor is occupied by the executive offices and directors' rooms.

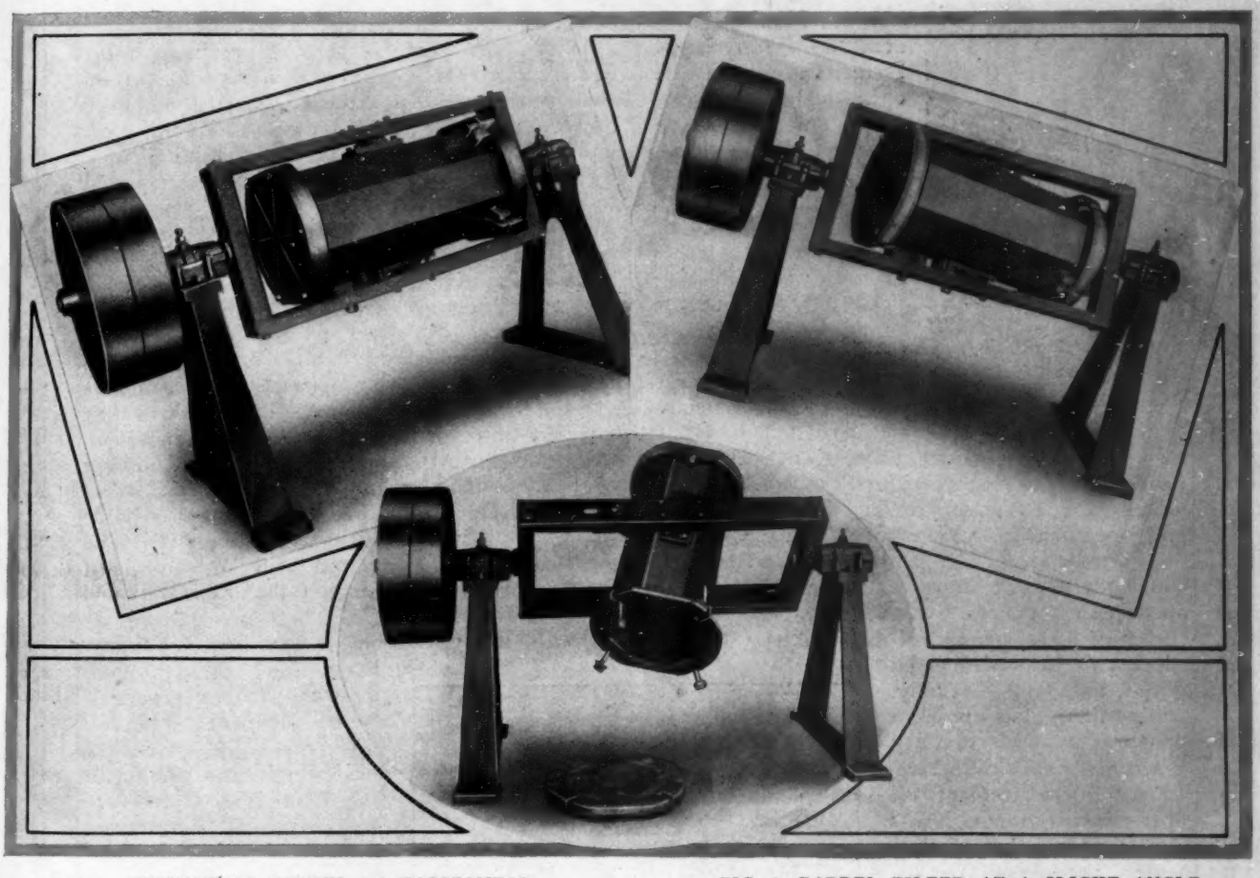


FIG. 1—BURNISHING BARREL IN HORIZONTAL POSITION

FIG. 2—BARREL TILTED AT A SLIGHT ANGLE

FIG. 3—BARREL ROLLED OVER IN DISCHARGING POSITION. THE COVER HAS BEEN REMOVED

The William Tod Co., Youngstown, O., manufacturer of rolling mills, engines, etc., has installed two air furnaces, which will greatly increase the melting capacity of the plant. The foundry is being equipped to produce sand and chilled rolls, in addition to the line of engine and general machinery castings now made.

THE ABC OF IRON AND STEEL

The Manufacture of Open-Hearth Steel

By Kenneth Seaver

IN 1861 Charles, William and Frederick Siemens originated the open-hearth process, which since has taken a commanding lead over all other methods for the manufacture of steel. In this country particularly, its growth has been phenomenal. In 1900 the production of Bessemer steel ingots in the United States was 6,684,770 tons as compared with 3,398,135 tons by the open-hearth process. In 1905 the spread in output was further reduced, the tonnage of Bessemer having been 10,914,372 and open-hearth, 8,971,376. Two years later the production of open-hearth steel almost equaled that of Bessemer, while in 1908 the open-hearth tonnage exceeded that of the converter process by more than 1,750,000 tons. Since 1908 the open-hearth output has gained steadily, while there has been a proportionate decline in Bessemer steel production. In 1911 the tonnage of open-hearth ingots was almost double that of Bessemer, the output of the former having aggregated 15,027,459 tons and of the latter, 7,890,753.

The rapid development of the open-hearth practice primarily is due to the growing scarcity of ores from which pig iron can be made, either sufficiently low in phosphorus for acid Bessemer or sufficiently high for basic Bessemer steel. As none of the phosphorus is removed in the acid process, steelmakers are limited to pig iron which contains only the limited amount of phosphorus allowable in steel. On the other hand, in the basic Bessemer process this element must be sufficiently high, approximately 2½ to 3 per cent, so that its oxidization together with that of the manganese and carbon shall generate sufficient heat to keep the charge hot, otherwise, what is known as a *cold heat* will result.

The open-hearth, on the other hand, adapted to either basic or acid practice, can utilize pig iron and scrap of a wide range of analysis and is in no way dependent for its heat upon the temperature generated by the oxidization of the impurities in their elimination from the metal bath.

As compared with the Bessemer process, the operations of the open-hearth are under greater control and samples can be taken at frequent intervals for both physical and chemical tests. Furthermore, there is less danger of over-oxidization and as a whole, the open-hearth product is more uniform and reliable than that of the Bessemer converter. The yield of ingots compared with the total of metal charged is also higher than that obtained in converter practice.

With the exception of the bottom lining, basic and acid open-hearth furnaces practically are identical. The following description of the design and construction of these furnaces applies to each type and in this case a producer gas-fired furnace will be considered. The furnace consists of a rectangular basin or hearth with ports at each end to admit gas and air. It is arched with a roof, from 9 to 12 inches thick, and at each end are two checker chambers, one to pre-heat or regenerate the air and the other for the gas. When firing the furnace, gas and air are admitted through the ports, being deflected downward by the incline of the latter, and unite in combustion over the hearth. The gases thus generated enter the opposite ports, pass through the checker chambers,

Kenneth Seaver

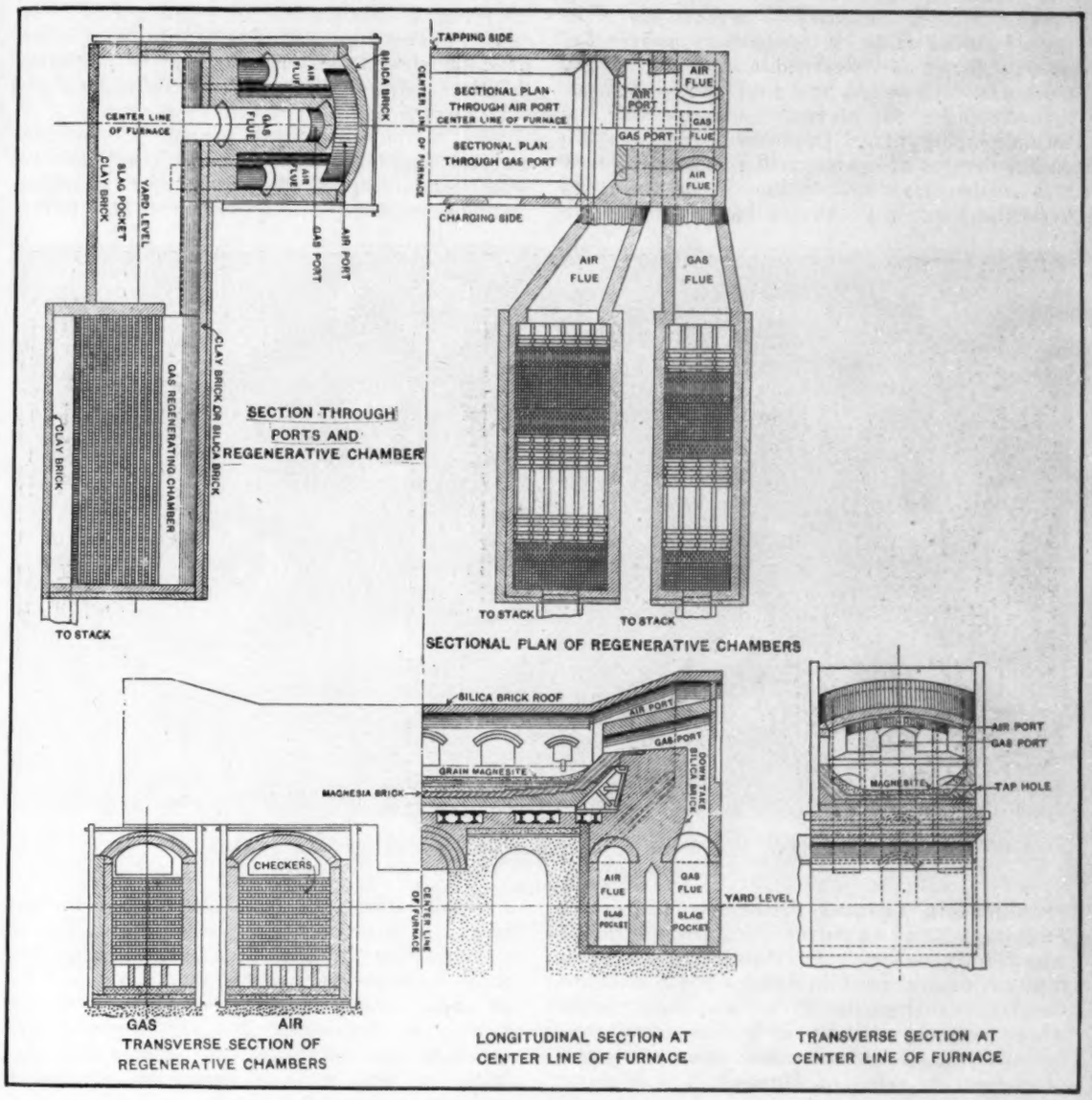
Kenneth Seaver, chief engineer and assistant general sales manager of the Harbison-Walker Refractories Co., Pittsburgh, is a graduate of the Massachusetts Institute of Technology, class of 1900, his earlier education having been obtained at Phillips Andover Academy. He served several years in various capacities in the engineering departments of the Pennsylvania Lines West, and the Baltimore & Ohio railroad and in 1903 he became associated with the Harbison-Walker Refractories Co. Mr. Seaver is author of "A Study of the Open-Hearth" and "A Study of the Blast Furnace", and in addition, he has contributed widely to technical publications on the use of refractories in the iron and steel and allied industries.

heating the checkers and usually from 15 to 20 minutes, dependent upon the nature of the charge and furnace conditions, the gas and air currents are reversed, creating a more intense heat over the bath, as a result of their passage through the heated checkers at alternate ends of the furnace. This reversal continues until the charge is ready to tap.

With each reversal of the gas and air currents the temperature of the checkers increases and the metal bath is subjected to a continually rising heat of combustion. With a full charge of cold stock and fuel, poor in quality or scant in quantity, the checkers will prevent the heats from becoming unduly high, but with plenty of gas and good melting conditions, any desired temperature can be attained, the limit being only what the brickwork will stand. The admission of gas and air is controlled by valves.

Open-hearth furnaces vary in size from 5 to 15 tons for special steels, to 60 and 80 tons for standard grades. The 60-ton type is now generally being installed in open-hearth steel plants and these produce from 65 to 70 tons per heat, while several 80-ton furnaces are producing regularly 100 tons or more per heat. To handle the ingots advantageously, furnace units of from 50 to 60 tons usually are considered preferable, except possibly in plants of the largest capacity.

The whole furnace is tied together with heavy beams, serving as buckstays and it is connected top and bottom by tie-rods with turnbuckles, which permit adjustment as the

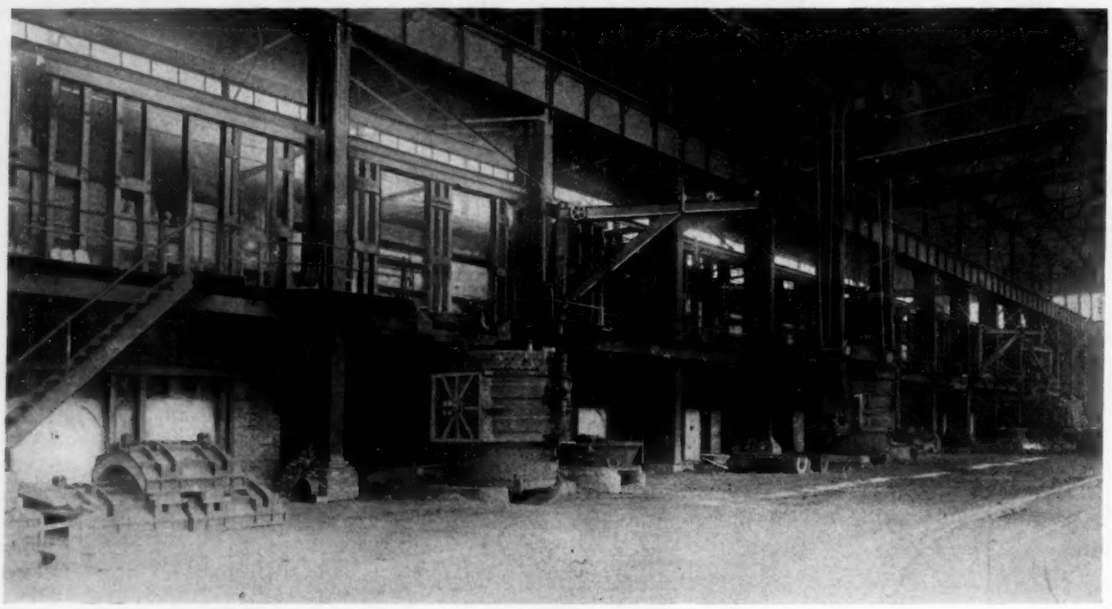


DESIGN OF A MODERN, STATIONARY OPEN-HEARTH FURNACE

furnace is heated. The roof invariably is made of silica brick, generally 8 inches thick, but in furnaces of the larger type the roof is frequently 12 to 13½ inches in thickness. Such a roof, when of large span and low rise, insures a good design to resist the widely varying stresses of temperature changes. In parts of the roof 18 to 20-inch sections give excellent results. Compared with a 12-inch roof, the increased radiation from a 9-inch roof, once considered necessary to prevent the melting of the silica brick, is needless and so far as this factor is concerned it may be of any thickness. However, the roof should be sufficiently high to prevent burning away by the impinging flame from the ports. In the earlier designs of open-hearth furnaces the roof was made comparatively low in an effort to keep the flame close to the bath.

work, resulting in wasteful operation and excessive renewals. In one instance a change in the proportioning of an acid furnace resulted in increasing its life to 1,200 heats, whereas formerly general repairs were necessary after 300 heats. The maximum width of furnaces usually is about 15 feet, the length being approximately from two to two and a half times as great as the width. The hearth should be of medium depth, about 15 to 20 inches, but it should be sufficiently shallow to promote thorough heating and reasonably quick working of the bath. On the other hand, it should be deep enough to minimize the oxidation of the metal, thereby avoiding over-burning and a reduction in the output.

The entire bottom and hearth are built-in and are supported by a pan of heavy riveted steel plates carried by beams or channels resting on piers entirely independent of the



CASTING FLOOR OF A TYPICAL OPEN-HEARTH STEEL PLANT

In modern furnaces the skewbacks for the roof arch are supported on heavy channels which form a part of the furnace framework, thus taking up the full thrust of the arch and thereby relieving the front and back walls, whose renewal and repair is thus made comparatively easy of accomplishment. In some of the earlier types of furnaces a wall repair often involved the rebuilding of the roof. Furnace roofs frequently are arched longitudinally, that is, from port to port, as well as across the furnace. This insures stability of construction and aids in providing for expansion.

Proper operation demands a hearth sufficiently long to insure complete combustion over the bath. Otherwise, a portion of the gas burns in the ports and upper checker

remaining structure. The only difference between the basic and open-hearth processes is in the bottom material employed and the different slags carried by the two methods. In the acid process the slag is formed by the silica sand adhering to the pig iron and the silica from the oxidation of the silicon in the charge, as well as from oxides of manganese and iron formed during the manipulation of the bath. If a basic lining were employed, a reaction would occur between it and the acid slag and, therefore, an acid or neutral lining is used. In basic practice, a neutral or basic material is required to avoid a reaction between the bottom and the slags rendered basic by the addition of lime to remove phosphorus and sulphur.

All acid furnace bottoms are made from

silica sand, a typical analysis of this material being as follows:

Water	0.24
Silica	97.25
Alumina and iron oxide	0.16
Lime	0.08
Magnesia	0.39
Alkalis	0.36
Loss on ignition	0.36

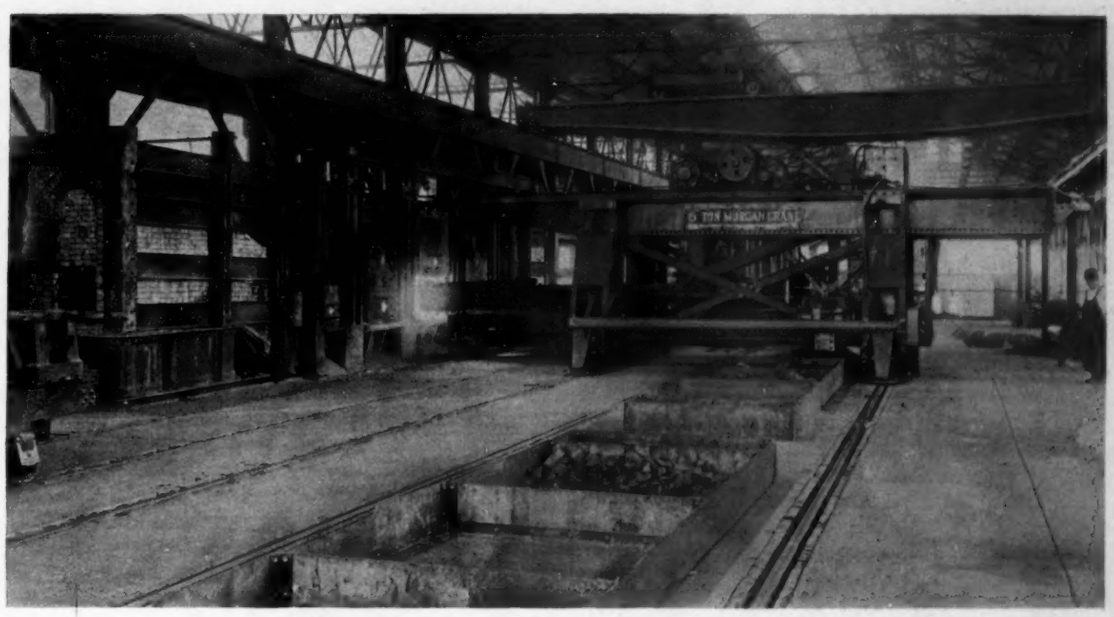
Certain beach sands and silica deposits in the west and middle west give good results, but too high a content of silica may render difficult the proper setting of the bottom. On the other hand, if the impurities are high, the sand although setting readily, erodes easily and fails to make a sufficiently dense bottom. Aside from the chemical analysis of the sand, the physical characteristics also are of importance. The use of carbon as a neutral material is out of the question. While it resists the action of the slag, carbon is rapidly absorbed by the metal.

Bauxite, although exceedingly refractory, is not available for open-hearth furnace use, as it is difficult to calcine sufficiently to eliminate its excessive shrinkage. Bauxite is a hydrous oxide of alumina and analyzes approximately as follows: Silica, 4 to 7 per cent; iron peroxide, 3 to 5 per cent; alumina, 60 per cent, and water 30 per cent.

Chromite or chrome ore, a sesquioxide of chromium, although practically neutral, is so infusible that it has been found practically impossible to set a bottom so that it will not be subject to mechanical erosion rather than chemical reaction. A typical analysis of chrome ore follows: Sesquioxide of chromium, 38 to 40 per cent; alumina, 24.50 per cent; iron peroxide, 17.50 per cent; silica, 3.25 per cent, and magnesia, 15 per cent. In spite of its high refractoriness, chromite of the proper analysis, when properly prepared, is used extensively for daubing and patching around the jambs, ports and walls of open-hearth furnaces. A neutral bottom would be ideal, thereby permitting the manufacture of both basic and acid steel on one bottom, but the materials at command do not permit of this practice.

Lime or calcium carbonate, $Ca\ Co_3$, in its CaO form, theoretically is excellent for bottoms, but it cannot be used as it slacks rapidly when exposed to air. Dolomite, a magnesium limestone, is seldom used for open-hearth furnace bottoms, but owing to its low first cost, it is frequently employed for repairs. It also slacks somewhat on exposure to air, which is a factor when the stock is more than 10 days old, but is of less importance in a plant which calcines its dolomite. On the other hand, dolomite bottoms do not set as solidly as magnesite, portions sometimes becoming detached. It also is more subject to erosion and the absorption of the metal than magnesite, thereby increasing the chance of serious breakouts. However, it sets somewhat more rapidly than magnesite. A typical analysis of dolomite follows: Silica, 5.52 per cent; alumina and iron, 3.74 per cent; calcium, 29.20 per cent; magnesia, 17.31 per cent, and loss on ignition, 43.82 per cent.

Magnesium carbonate, $MgCO_3$, when calcined to MgO, commercially known as magnesite, is unquestionably the best material for open-hearth bottoms and all original bottoms now are made with this material. Even by those using a large percentage of dolomite



CHARGING FLOOR OF AN OPEN-HEARTH STEEL PLANT, SHOWING ELECTRICALLY-OPERATED CHARGING MACHINE

for repairs, it is admitted to be the best material available and the only argument in favor of dolomite is its low first cost. Austrian magnesite, with its high percentage of iron, makes the material set in the furnace bottom, forming a hearth of maximum density subject to minimum erosion by the metal and is practically unaffected by the slags. Furthermore, indefinite exposure to air results in almost no deterioration of the product, while with a dolomite bottom, in the case of a shutdown, this of necessity would have to be renewed. Austrian magnesite for furnace bottoms analyzes as follows: Silica, 2.84 per cent; alumina, 0.929 per cent; iron peroxide, 8.571 per cent; lime, 1.120 per cent; magnesia, 85.32 per cent, and carbon dioxide, 0.50 per cent.

Grecian magnesite, when used for furnace bottoms, fuses with difficulty, owing to its high refractoriness and it requires the admixture of silica clay or other impurities which render its results in practice unreliable.

Construction of the Acid Bottom

When making the tap hole, an opening 15 to 20 inches square, arched on the outside with silica brick, is left on the inside of the furnace wall near the base on the tapping side. This hole is closed with a tapered plug, around which ganister is rammed, the plug then being withdrawn. The hole is almost filled with anthracite coal from the charging side and is closed from the outside with clay, well rammed into position.

The bottom is built on the steel pan previously referred to, and consists of from one to three courses of silica or clay brick, preferably the former, which are laid with additional courses stepped-up at the sides and ends, thus allowing for a sand bottom of the same approximate thickness over the entire hearth. Sometimes a thin layer of sandstone or granite chips is spread over the brick. Gas is turned into the furnace until the heat softens the chips and then a thin layer of sand is spread over this until the coating is glazed. This operation is repeated until a bottom of the desired depth is obtained and this is extended up the walls at least a foot above the slag line. A wash-heat, consisting of a charge of acid open-hearth slag, is run as a preliminary to the first heat, the furnace banks being thoroughly washed-down with this slag.

The tap hole in a basic bottom is made in a similar manner to that for an acid bottom, except that the opening is generally arched with magnesia brick, and ground chrome ore or plastic magnesite is rammed around the plug. When the plug is withdrawn the opening is tamped with magnesite, or magnesite mixed with dolomite. The basic bottom consists of two or three courses of first quality clay brick placed on the steel pan, followed by three or more courses of magnesia brick which are stepped-up the banks as in an acid bottom. Frequently one or more courses of chrome brick are inserted between the clay and magnesia brick, but sometimes magnesia brick only are used. The latter retard the breaking out of the metal in the event of the bottom being cut through and usually allow the tapping of the charge before an actual breakout occurs. In some foreign plants a much larger proportion of magnesia brick is used, covered only with 6 or 8 inches of sintered grain magnesite.

In American plants, the bottom proper is made of grain magnesite sometimes mixed with tar and from 5 to 15 per cent of basic cinder. It is built-up in successive layers in a similar manner to the preparation of a sand bottom for an acid furnace. A wash-heat of basic slag or roll scale then is melted, allowing whatever portion will do so to soak well into the bottom.

In an acid furnace, the front and back walls are built of silica brick, but in a basic furnace, silica brick is employed from a point a few courses above the slag line upward and magnesia brick below this line. The practice of inserting one or two courses of neutral chrome brick between magnesia and silica brick in the side walls not always is adhered to, but nevertheless is an insurance against any fluxing action between the two if the temperature should run above normal. In basic practice, the walls should be daubed well up toward the skew line with fine chrome ore. The ore should be of sufficient plasticity to protect the walls from erosion by gases laden with furnace dust and iron oxide spray. The mass of brick forming the ends of the furnace hearth, termed the bulkheads, formerly were built solid, but now are composed of a thick facing of brick over a steel frame. In this way the bulkheads are cooled to a certain extent and this has effected great economies in the cost of maintenance. In the best basic practice, the entire bulkhead, up to the ports, is faced with magnesia brick and frequently is banked with lump or ground chrome ore.

Construction of the Ports

On the proper construction of the ports, which are the openings through which gas and air are admitted, depends, in a great measure, the successful operation of the furnace. The ports, alternately, are subjected to the outgoing rush of incandescent gases laden with particles of ore, limestone, slag, etc., and although properly constructed as to size and alignment, it is difficult to keep them in the condition as originally designed. The majority of large open-hearth furnaces have one gas and one air port at each end, but this may be varied by two gas and two air ports, one gas and two air ports or some other arrangement.

(*To be continued.*)

HEAVY EXPORTS

Of Iron and Steel Products—Largest Since Last August.

Tonnage iron and steel exports in March were the largest since August, 1912, reaching a total of 257,053 gross tons, or at the rate of nearly 3,100,000 tons annually. The total exports for the nine months ending March were 2,273,007 tons, or at the rate of 253,000 tons a month. The March exports were particularly large in wire rods, merchant steel bars, structural material, tin plates and pipes and fittings.

IRON AND STEEL EXPORTS, GROSS TONS.

	March,		Nine months, ending March,	
	1912.	1913.	1912.	1913.
Scrap	6,915	10,582	57,107	81,714
Pig iron	19,689	28,711	100,805	223,020
Billets, sheet bars, etc	23,782	16,650	150,410	206,604
Wire rods	7,859	9,320	29,063	53,000
Rails	27,332	25,371	273,033	335,362
Steel bars	15,495	20,224	98,365	179,963
Iron bars	701	2,180	10,365	19,752
Structural	19,853	32,065	174,100	246,155
Hoop, band and scroll	740	2,529	5,565	13,810
Sheets and plates	39,669	42,911	315,986	411,796
Tin plates	5,950	9,164	50,758	54,515
Barbed wire	6,789	7,041	77,759	67,571
All oth. wire	11,424	11,011	95,630	105,390
Cut nails	825	354	7,971	3,995
Wire nails	2,964	5,520	42,359	44,346
All other, including tacks	1,181	430	9,576	3,159
Pipes and fittings	26,667	29,493	159,324	190,594
Railroad spikes	*	980	*	9,725
Bolts, nuts, rivets, washers	*	1,842	*	15,181
Horse shoes	*	142	*	882
Cast radiators	384	533	3,362	6,473
Total	218,219	257,053	1,661,538	2,273,007

*Not stated prior to July 1, 1912.

The March exports of pipes and fittings, 29,493 tons, were the largest on record, the next best month in this item being April, 1912, with 28,622 tons. The tin plate exports, 9,164 tons, were the largest since June, 1912, when they amounted to 9,228 tons.

The total value of all exports of iron and steel in March is stated by the government at $27,201,197. The heaviest month stated was May, 1912, with $28,050,247, and last March according to the official returns appears to stand second, but beginning July 1, 1912, the government removed electrical machinery from the iron and steel classification. Those exports amounted in March to $2,489,374, and adding this to the total stated for March makes $29,690,571, the amount properly comparable with May, 1912, and showing that in value the iron and steel exports of last March were the largest on record.

IRON AND STEEL IMPORTS, GROSS TONS.

	March,		Nine months, ending March,	
	1912.	1913.	1912.	1913.
Scrap	650	3,844	8,431	28,741
Pig iron	10,154	15,628	88,237	113,526
Blooms, billets, steel n. e. s.	1,502	2,143	17,611	14,692
Wire rods	1,039	1,551	10,521	11,434
Rails	328	467	2,621	2,921
Bar iron	1,150	2,674	17,260	21,744
Structural	416	392	2,461	4,343
Sheets and plates	121	348	1,735	2,858
Tin plates	106	200	2,562	1,790
Total	15,466	27,247	151,439	202,049

IMPORTS BY MONTHS.

	1910.	1911.	1912.	1913.
January	56,207	33,071	20,008	21,741
February	43,613	20,812	11,622	24,904
March	54,176	23,533	15,466	27,247
April	47,698	22,392	12,482	.....
May	42,569	23,347	15,955	.....
June	30,322	29,399	21,407	.....
July	41,933	15,782	17,916	.....
August	36,879	10,944	80 572	.....
September	30,961	14,039	18,740	.....
October	31,455	21,035	25,559	.....
November	40,585	13.880	24,154	.....
December	31,575	19,665	21,231	.....
Totals	487,973	256,903	225,072	73,892

IRON ORE IMPORTS, BY MONTHS.

	1910.	1911.	1912.	1913.
January	284,823	102,600	154,118	175,463
February	170,427	94 820	129,693	188,734
March	163,633	134,785	157,469	164,865
April	206,135	133,900	178,502	.....
May	240,833	217,467	194,482	.....
June	193,415	118,296	180,122	.....
July	248 810	200,845	185,677	.....
August	282,949	175,183	178,828	.....
September	208,892	184,456	180,571	.....
October	219,571	172,459	202,125	.....
November	197,833	128,019	163,017	.....
December	173,710	148,902	199.982	.....
Totals	2,591,031	1,811,732	2,104,576	529,062

Imports Increased

March imports of iron and steel amounted to 27,247 gross tons, being the heaviest for any month since June, 1911, when they amounted to 29,399 tons. The increase was chiefly in scrap and pig iron, the pig iron including manganiferous metals. Tin plate imports in March were only 200 tons, the imports for the nine months ending March being at this same rate.

Iron ore imports in March were 164,865 tons, or smaller than in January or February, thus reversing the experience of the two preceding years, when March imports showed decided increases.

This statistical presentation is based upon advance sheets issued by the government, prior to the regular Monthly Summary. The advance sheets do not give imports by points of origin, as does the Monthly Summary, so that the statement given herewith of iron ore imports by country of origin is drawn from the previous Monthly Summary and, therefore, is for the month of February instead of for March. It will be observed from this statement that in the eight months ending February, Cuba has supplied 67½ per cent of our iron ore imports.

IRON ORE IMPORTS BY ORIGIN.

	February.	Eight months.
Spain	12,917	80,084
Sweden	18,966	162,940
Canada	756	97,538
Newfoundland & Labrador	.....	110,633
Cuba	152,395	994,173
Other countries	3,700	29,029
	188,734	1,474,397

Machine Tool Builders' Convention

The semi-annual convention of the National Machine Tool Builders Association, which opened at New York, May 15, will be entirely a business session. No papers will be read and the two days sessions will be confined to committee meetings. The number of committees has been increased.

Will Meet in Detroit

The annual convention of the National Association of Manufacturers of the United States will be held at Detroit, May 19-21. Accident and fire prevention and industrial education will be the main topics considered at the meeting.

The Bessie furnace at New Straitsville, O., is being repaired, and will be blown in after two years' idleness.

VALUE OF IRON AND STEEL EXPORTS—TONNAGE AND NON-TONNAGE.

	1909.	1910.	1911.	1912.	1913.
January	$10,329,388	$14,513.394	$18.738,391	$18,451,914	$25,141,409
February	10,947,159	13 949,082	18,690,792	21.801,570	24,085,871
March	13,873,746	17,253,503	22,591.991	24 474,799	27,201,197
April	13,058,297	16,529,260	24 916,912	26,789.853	.....
May	12,964,367	17,658.042	20.616,795	28.050,247	.....
June	13,779 736	16,503,204	20,310,053	24,795.802	.....
July	11,866,772	16.108,102	17,454,772	24,913,052	.....
August	14,134,487	17,628,537	20 013,557	25,450.107	.....
September	12.966,908	16,776,178	19,875 308	23,286,040	.....
October	14,249,598	17,452,085	20,220.833	25,273,059	.....
November	14 434,690	18,594.806	20,823.061	26,406,425	.....
December	15.069,246	18,300,710	22,186,996	23,750,864	.....
Totals	$157,674,394	$201,271,903	$249,656,411	$289,128,420	$76,428,477

EXPORTS OF TONNAGE LINES—GROSS TONS.

	1909.	1910.	1911.	1912.	1913.
January	70,109	118,681	152,362	151,575	249,532
February	84,837	110,224	150 919	204,969	241,874
March	94,519	124,980	216,360	218,219	257,053
April	100,911	117,921	228.149	267,312	.....
May	109,808	135,306	178 589	307,656	.....
June	114,724	120,601	174,247	273,185	.....
July	100,850	127,578	162,855	272,944	.....
August	105,690	131,391	177,902	282 835	.....
September	97,641	119,155	181,150	248,746	.....
October	110,821	129,828	186.457	250,611	.....
November	116,105	155,138	187.554	233,341	.....
December	137,806	150,102	190,854	235,931	.....
Totals	1,243,567	1,540,895	2,187,724	2,948.466	2,273,007

THE IRON TRADE REVIEW

DEVOTED TO THE IRON, STEEL, MACHINERY AND FOUNDRY INDUSTRIES

Published Every Thursday by

The Penton Publishing Company

CLEVELAND

CHICAGO	1521-23 Lytton Bldg.
CINCINNATI	503 Mercantile Library Bldg.
NEW YORK	1115 West St. Bldg.
PHILADELPHIA	611 Bulletin Bldg.
PITTSBURGH	2148-49 Oliver Bldg.
WASHINGTON, D. C.	501 Metropolitan Bank Bldg.
BIRMINGHAM, ENG.	Princes Chambers

Copies published three months or more previous to date of current issue, 25 cents each.

All communications relating to changes of advertising copy, discontinuances, etc., must be received ten days prior to the next publishing date.

Subscription, United States and Mexico $4.00 per year.
Canada and other Foreign Countries $5.50 a year.

Entered at the Postoffice at Cleveland as Second Class Matter.

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Cleveland, May 15, 1913

Mr. Morgan's Patriotism

The intensely interesting story, told at a recent banquet in New York by Col. George Harvey, of the last interview he had with J. Pierpont Morgan, is worthy of being made a part of the permanent literature of the country. It ought to be in all school readers. Col. Harvey's narration shows in a most impressive manner the intense patriotism of America's greatest business man.

When Col. Harvey called to make what proved to be his last visit, Mr. Morgan spoke in the optimistic manner which was characteristic of him regarding the country. Then his mind went back a few years to a time when a man, whom he described as "an Anglicized sycophant", mistakenly thought that he could curry favor with Mr. Morgan by speaking contemptuously of Mr. Bryan, to whom Mr. Morgan had been introduced by Col. Harvey on the preceding day. Mr. Morgan differed radically with Mr. Bryan on many issues, but the two men were countrymen and Mr. Morgan deeply resented the attack of the sycophant.

After referring to the incident in London, Mr. Morgan, in his last interview with Col. Harvey, said: "And do you recall those lines from Scott that you quoted—when that man—*that man*—had left the room?"

Col. Harvey began to repeat:

"Breathes there a man with soul so dead,
Who never to himself hath said—"

Col. Harvey hesitated for a moment, and Mr. Morgan, in a voice that had its old distinctness, said: "This is my own, my native land!" Then Col. Harvey, resuming, quoted the last lines:

"Whose heart hath ne'er within him burned
As home his footsteps he hath turned
From wandering on a foreign strand?
If such there breathe,
Go, mark him well!"

Col. Harvey relates that Mr. Morgan sat perfectly still for a minute and then, unconsciously beating time on the arm of his chair, as if soliloquizing, repeated:

"Who never to himself hath said,
This is my own, my native land!"

Then, rising with difficulty from his chair, for he was feeble, he said with emphasis:

"When you see Mr. Wilson, tell him for me that if ever there should come a time when he thinks any influence or resources that I have can be used for the country, they are wholly at his disposal."

These were indeed the words of a patriot. Mr. Morgan was a partisan, but he was more than that. If the country needed his services, he was ready to respond, and he cared not who might be temporarily occupying the presidential chair at Washington.

Next to impressing upon the country that character is more important than money, Mr. Morgan's greatest service was in putting patriotism above partisanship.

Closing the Door

When is a meat slicer a machine tool? This was the conundrum which was put up to the United States Board of General Appraisers at New York a few days ago. The fact that the implement had a cutting edge made it a machine tool in the eyes of the importers, that is, while they were bringing it across the borders. Incidentally, had they made their contention good, they would have saved themselves duty amounting to 15 per cent.

With all its proclaimed inequalities and hidden dangers, there is one shining virtue which all engaged in the manufacture of metal working machinery will freely ascribe to the Underwood bill. That is its clear, concise and common sense definition of a machine tool. Paragraph 169 of Schedule C reads: "Machine tools as used in this paragraph shall be held to mean any machine operated by other than hand power which employs a tool for working on metal."

This defining of the limits of the term promises to close the door to many of the ridiculous contentions now being made by importers to bring a helter-skelter assortment of devices under the machine tool classification in the present tariff.

It is really unkind in President Wilson to ask the House of Representatives to consider such a dry

topic as the currency at the height of the baseball season in Washington. Think of the games the members of the lower branch could see while the senators debate the tariff!

Short Postage on Foreign Letters

Despite the fact that nearly everyone knows something about foreign postage rates and regulations, and the Government Bureau of Foreign and Domestic Commerce stands ready at all times to give freely information on this subject, foreign firms are frequently heard to complain of having to pay excess postage on correspondence from American houses. A large importer at Marseilles, France, has reported that more than half of his American correspondence, from other than houses doing a regular foreign business, came to him each with a 2-cent stamp. Then he had to pay double the excess, or 6 cents on each letter. American firms soliciting foreign business are in danger of creating a bad impression by this practice. The story is told of a French firm that called the attention of one of its American correspondents to the fact that insufficient postage was being used, and asked that the matter be attended to, as it was compelled to pay double the excess postage. The American manager replied by return mail, expressed his sorrow at having permitted such gross negligence, assured his customer that the matter would not happen again —and then affixed a 2-cent stamp to the letter and saw that it was properly mailed.

Steel Trade's Sound Foundation

Events of the past four weeks have shown upon what sound foundation the steel trade rests. Throughout the country the purchasing tendency has been greatly lessened and yet there has not been concurrently a decrease in the pressure upon mills for deliveries of material already specified. Analyzed in detail, it is found the lessened buying tendency involves almost exclusively those lines in which buyers had already covered themselves far ahead.

With respect to forward buying, there is almost complete stagnation, and yet the country continues to take steel deliveries at the maximum rate. There is evidently no decrease in actual consumption. If the general business activity of the country had decreased, there would now be decreased mill shipments and curtailed production, but nothing of this sort has occurred or is regarded as likely to occur in the near future. The slowing down is merely as to the future.

The demand which the steel mills are now supplying is evidently a demand resting upon commitments already made; the country is actually absorbing the material. There is merely an uncertainty, or a conservatism, as to the future. It does not follow even from this that while mill activity is maintained for the present a slowing down is certain or even probable for any period in the second half of the year.

A particularly favorable feature of the steel situation is that in no direction is there a special demand for steel against projects or undertakings which, when completed, will leave a gap. The flow is a smooth and normal one. There is no burst of activity in the erection of skyscrapers of buildings. A large part of the structural work is in relatively small jobs, while another large part is in very large undertakings which, now started, will require years rather than months to complete. The rail demand shows no signs of being abnormally large; it is reasonable to contemplate the railroads continuing to buy rails from year to year at the present rate. Much has been made of the car buying in recent months, but as a matter of fact, the car shops of the country are working at only about 60 per cent of their rated capacity, surely no gait which it should be difficult to maintain. The demand for wire products is by no means a particularly active one, and ordinary building operations throughout the country are abnormally small rather than abnormally large. There is nothing spectacular in the demand for tin plate, which is coming merely in normal course, just as it is likely to come next year and the year after. In sheets, there is a full demand for electrical purposes, metal furniture, automobile construction, etc., just such as one has a right to expect year by year. In tubular goods there is a smooth, even flow of business depending upon no special activity, with no temporary stimulus from oil booms, gas excitement or the like.

And yet this ordinary, even humdrum demand for steel products in particular makes it that the steel industry as a whole is fully employed, with all steel plants straining to turn out their maximum tonnages. Surely this is a solid foundation for the industry.

The lightness of forward buying at this time can hardly be held definitely to presage decreased consumption in the future. Were demand heavier, for what would that demand be? Necessarily it would be chiefly for material to be delivered late in the year. It is regarded as seasonable for business to expand in the spring, but as regards the steel industry this occurred months ago. Buyers then provided against this spring and summer, by placing their contracts and later their specifications, shipments against which they are now receiving willingly. Activity at this time would mean provision for the late fall and winter, which would be entirely unseasonable.

That there is no danger of large importations of Chinese pig iron is shown by the statements of American Consul General Roger S. Greene, at Hankow, China, in a letter published elsewhere in this issue. The infant iron industry has had a hard struggle in China and it promises to be a long time before it can meet the demands of its own country. As the Chinese progress in civilization, the demand for iron and steel products will increase, and the rate of wages will advance.

Active Developments Under Way on Hill Lands

Report of Trustees Shows Preparations Being Made for Future—Map Showing Great Northern Holdings on Mesabi

Efforts being made by the Hill interests on the Mesabi range to meet the situation that will confront them on the surrender of the United States Steel Corporation's lease, are shown in the sixth annual report of the trustees of the Great Northern Iron Ore Properties. The lease has two years to run, being released on Jan. 1, 1915.

A release was procured last year from the Corporation of such properties as were not required for actual operations in 1913 and 1914. Development work has been started on several properties and estimates have been prepared showing the expenditures required for opening additional mines.

Stripping contracts have been entered into for removing overburden from properties known as the Dunwoody (formerly the Adams), Whiteside and Smith mines, which contain 28,123,445 tons of ore, according to estimates of the Minnesota tax commission.

On the Whiteside, $1,000,000 will be spent to make available 5,500,000 tons. The Dunwoody will require an expenditure of $2,000,000 to make available 8,000,000 tons and the Smith will require $120,000 to make available 600,000 tons of ore.

Expenditures for mine development appear in the report for the first time. The disbursement for this purpose in 1912 was $300,361.36.

This development, the report states, will probably place the Hill interests in position to mine and sell some ore during this year, a larger amount in 1914 and an increasing output in 1915 and thereafter. The opening of the mines, however, does not make it incumbent upon the Hill interests to do their own mining and selling, but places them in a position to do so, the report continues.

The balance of undistributed income remaining at the close of last year, was more than double that of Dec. 31, 1911, but the trustees state that it was thought advisable to conserve the resources to take care of the work of mine development.

The map accompanying the report, which is shown below, shows in detail the large holdings acquired by the Hill interests on the Mesabi range, as well as the properties retained by the Steel Corporation and those being prepared for mining.

Properties on which estimates have been made include the Enterprise, South Agnew, Wabigon and Section 16, Township 56, Range 23. On the Enterprise an expenditure of $600,000 will be required to make available 2,500,000 tons. On the South Agnew, $1,500,000 will be needed to make available 4,300,000 tons. The Wabigon will require $600,000 to make available 5,000,000 tons. In Section 16, $5,000,000 will make available 12,500,000 tons of standard ore and 3,725,000 tons of washable ore.

Estimated holdings of the Hill interests on Jan. 1, 1912, show an increase of 22,000,000 tons over the estimated holdings at the opening of 1911, as shown in the report for that year. The present estimate shows holdings of 430,021,773 tons, as follows:

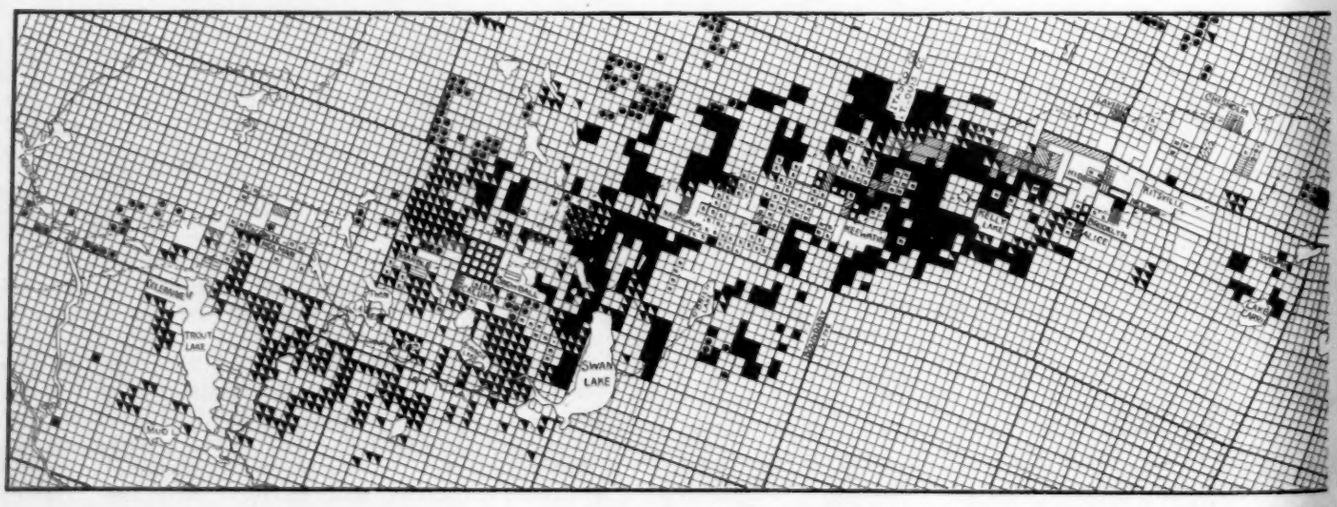
Leased by Corporation.	Tons.
Lands owned in fee.....	110,823,803
Leaseholds of the first class.....	109,744,785
Leaseholds of the second class..	106,826,190
Total under lease to Corporat'n	327,394,778
Covered by other leases.....	102,626,995
Grand total	430,021,773

Of the above, 44,457,584 tons held by the Corporation is designated as washable ore. In ordinary calculations two tons of washable material are allowed for one ton of concentrate.

Stanley Writes to the President

Washington, May 13.—Representative Stanley, of Kentucky, has sent a letter to President Wilson urging him to give a government position to B. S. Kaufman, Coatesville, Pa., former printer and publisher, who claims to have been driven into bankruptcy by steel and financial institutions of that city because he testified before the Stanley committee in regard to an alleged pooling agreement existing many years ago among some of the steel plate manufacturers. Mr. Stanley claims in his letter that Mr. Kaufman "has been boycotted by business interests and he is today a bankrupt."

The April output of the Nova Scotia Steel & Coal Co., New Glasgow, N. S., was as follows: Ore mined, 55,000 tons; coal mined, 68,300 tons; pig iron made, 7,580 tons; steel made, 7,300 tons.



MAP OF THE MESABI RANGE, SHOWING ACTIVE MINES AND

CURRENCY REFORM

Will be Considered by President Wilson and Leaders.

Washington, May 13.—To be known as an administration measure a banking and currency bill, proposed for this session of congress, will be shaped in conference between President Wilson and leaders of the house and senate. It will be revised along conservative lines, according to reports, and will be handled largely by Majority Leader Underwood in the house. Its consideration there is expected to begin early in June. The president favors a distinct law providing a guarantee of bank deposits and therefore is opposed to this feature being incorporated in the currency bill. Chairman Glass of the committee on banking and currency does not favor hearings on the proposed bill.

NEARLY A MILLION

Is Loss of Steel Corporation Unfilled Tonnage in Four Months.

A considerably greater decrease in unfilled orders than had been predicted was shown by the United States Steel Corporation in its monthly report covering April operations, which was made public May 10. This statement showed a further reduction in undelivered business of 490,194 tons over the preceding month. This is by far the largest monthly total that has been shown by the Steel Corporation since the new business began to fall short of the shipments three months ago. Since the first of the year, the loss from the high point of bookings has been 953,402 tons. The total unfilled bookings on hand April 30 are reported as 6,978,762 tons.

Since the plan of making monthly statements of unfilled tonnage has been followed by the Corporation, the statements of business on hand, the tonnage and percentage of increase or decline from the previous month, have been as follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Apr. 30, 1913....	6,978,762	490.194—	6.55—
Mar. 31, 1913....	7,468,956	187,758—	2.45—
Feb. 28, 1913....	7,656,714	170,654—	2.18—
Jan. 31, 1913....	7,827.368	104,796—	1.32—
Dec. 31, 1912....	7,932,164	79,281+	1.01+
Nov. 30, 1912....	7,852,883	258,502+	3.40+
Oct. 31, 1912....	7,594,381	1,042,874+	15.33+
Sept. 30, 1912....	6,551,507	388,132+	6.29+
Aug. 31, 1912....	6,163,375	206.296+	3.46+
July 31, 1912....	5.957,079	149,773+	2.58+
June 30, 1912....	5,807,346	56.363+	0.98+
May 31, 1912....	5,750,983	86,983+	1.52+
Apr. 30, 1912....	5,664,885	360,044+	6.97+
Mar. 31, 1912....	5,304,841	149,359—	2.79—
Feb. 29, 1912....	5,454,200	74,479+	1.38+
Jan. 31, 1912....	5,379,721	294,960+	5.71+
Dec. 31, 1911....	5,084,761	942.806+	23.24+
Nov. 30, 1911....	4,141,955	447,627+	12.06+
Oct. 31, 1911....	3,694,328	83.011+	2.25+
Sept. 30, 1911....	3,611,317	84,668—	2.34—
Aug. 31, 1911....	3.695,985	111,900+	3.33+
July 31, 1911....	3,584,085	223,027+	7.16+
June 30, 1911....	3.361,058	247,871+	7.96+
May 31, 1911....	3,113,187	105,617—	3.28—
Apr. 30, 1911....	3,218,704	228.597—	6.63—
Mar. 31, 1911....	3,447,301	46,758+	1.37+
Feb. 28, 1911....	3,400,543	289.624+	9.31+
Jan. 31, 1911....	3,110,919	436,162+	16.30+
Dec. 31, 1910....	2,674,757	85,656—	3.09—
Nov. 30, 1910....	2,760,413	111,536—	3.88—
Oct. 31, 1910....	2.871,949	286,157—	9.12—
Sept. 30, 1910....	3,159,106	379,088—	10.74—
Aug. 31, 1910....	3,537,128	433.803—	10.92—
July 31, 1910....	3,910,931	286,863—	6.72—

Ore Company Protests

Washington, May 13.—Complaints exactly like those filed recently by the Newport Mining Co. against the Chicago & North Western Railway Co. protesting its new tariffs for handling ore at the dock at Ashland, Wis., are made in a petition filed with the Interstate Commerce Commission last week by the Hayes Mining Co., which operates a mine at Ironwood, Mich. The charge of 5 cents a ton made by the North Western for transferring ore from the docks to vessels at Ashland and a demurrage rate of one-quarter of 1 cent per gross ton each day after the first 10 days represent the principal objections made.

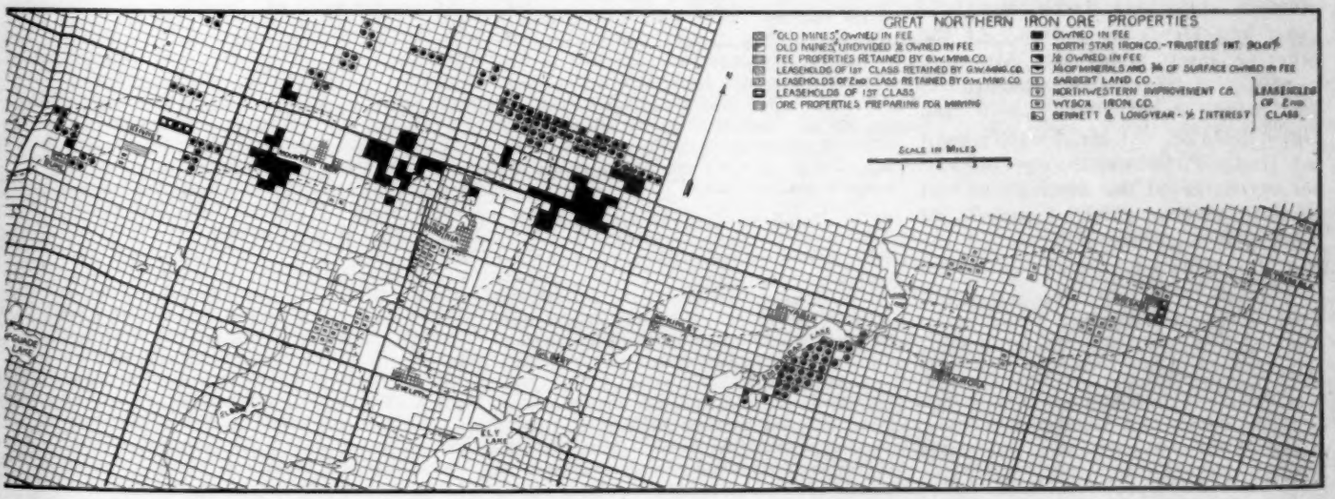
NEW BULK FREIGHTER

Ordered by Canadian Interests Will Be 625 Feet Long.

Canadian interests have ordered from the American Shipbuilding Co. a bulk freighter to be longer even than the steamers Col. James M. Schoonmaker and Wm. P. Snyder Jr., of the Shenango Steamship Co.'s fleet. The new ship will be 625 feet over all, 605 feet keel, 59 feet beam and 32 feet deep. Her gross tonnage will be less than either of the Snyder boats, as they have 5 feet more beam and 1 foot more depth, but are 8 feet shorter. The steamer will be built on the Isherwood system at the yard of the Western Shipbuilding & Dry Dock Co., Port Arthur, Ont., a subsidiary of the American Shipbuilding Co.

The vessel has been designed for the 60-foot Canadian lock, her beam just permitting her to clear. She also will have the advantage of the added draught of the Canadian lock, which is several inches greater than that of the Poe lock. Owing to their beam, the Snyder boats are unable to pass through the Canadian lock.

The placing of the order with the Western yard undoubtedly is to give the new vessel Canadian register, which will in no way interfere with her operation in the grain trade between the Canadian head of the lakes and Buffalo. She evidently is intended to be operated primarily in the grain trade. In order to stimulate shipbuilding in Canada the Canadian government allows a bounty on capital investment to the ship yard, but about a year ago it abolished the bounty on steel produced in Canada and, as there is no tariff for the admission of plates and shapes into the Dominion, American steel undoubtedly will be used in the construction of the new vessel.


GREAT NORTHERN IRON ORE PROPERTIES
"OLD MINES" OWNED IN FEE
OLD MINES UNDIVIDED ½ OWNED IN FEE
FEE PROPERTIES RETAINED BY G.N. MINING CO.
LEASEHOLDS OF 1ST CLASS RETAINED BY G.N. MINING CO.
LEASEHOLDS OF 2ND CLASS RETAINED BY G.N. MINING CO.
LEASEHOLDS OF 1ST CLASS
ORE PROPERTIES PREPARING FOR MINING
OWNED IN FEE
NORTH STAR IRON CO.-TRUSTEES' INT. 50.6%
½ OWNED IN FEE
MISC. MINERALS AND ¾ OF SURFACE OWNED IN FEE
SARGENT LAND CO.
NORTHWESTERN IMPROVEMENT CO.
WYSOX IRON CO.
BENNETT & LONGYEAR - ½ INTEREST
LEASEHOLDS OF 2ND CLASS.
SCALE IN MILES

OTHER HOLDINGS OF GREAT NORTHERN IRON ORE PROPERTIES (From Report of Trustees)

From Laborer to the Steel Corporation Presidency

James A. Farrell Takes the Stand as the First Witness for the Great Company in the Dissolution Suit—Tells of the Foreign Business

The hearings of counsel for the defense in the suit of the government for the dissolution of the United States Steel Corporation, were begun Monday morning, May 12, in New York, James A. Farrell, president of the Corporation, being sworn as the first witness. It had been a year, almost to a day, since the government opened the case by holding the first of its series of hearings, and nearly three months had elapsed since that series was brought to an end. The room, No. 2015, 71 Broadway, where the hearings are being held, is, by a strange coincidence, the same that once served as headquarters for Mr. Farrell, when he was foreign sales manager of the American Steel & Wire Co., prior to the formation of the Steel Corporation.

This room now presents an appearance entirely different from that when the government hearings were held in it. It is now divided off into two parts by means of a green cord supported by brass posts, giving it more of the aspect of a court room. On one side of the cord are the seats for the spectators, while on the other side the room is devoted to the legal proceedings. Mr. Farrell, during his examination, was seated on a platform at one end of the room. In front of him was the official stenographer and to the right and left were tables at which sat the counsel. After these came a table, extending the width of the room, for representatives of the press.

There were present for the government, Attorneys Jacob M. Dickinson and Henry E. Colton. At the other counsel table, sat Attorneys Cordenio A. Severance, Richard V. Lindabury, Raynal C. Bolling and David Reed Jr. At Mr. Farrell's right sat Henry P. Brown, the special master in charge of the hearings, and at his left, with a lapful of papers, sat John Hughes, general agent of the Steel Corporation. Judge Gary and John Reis, chairman and vice president of the Corporation respectively, were also in the room a considerable part of the time.

Throughout his examination, which was conducted by Cordenio A. Severance, Mr. Farrell was extremely serious and did not show any tendency to respond to the witticisms of the lawyers. On one occasion, while he was describing the markets of the Steel Corporation, he was asked about the business in Tasmania. "It is a good business—for Tasmania," he said, whereupon several hearers smiled. "I do not mean to be facetious," Mr. Farrell hastily added. The witness answered in a simple and direct manner all questions which were put to him. Not once was his memory at fault and in his testimony on the world-wide ramifications of the business of the Steel Corporation his knowledge of geography out-Baedekered Baedeker.

President Farrell, after being sworn by Special Master Henry Brown, stated that he resides in Brooklyn and that he has occupied his present office as president of the United States Steel Corporation since Jan. 10, 1911. Questioned by Mr. Severance, of counsel for the Corporation, President Farrell's testimony was as follows:

Tells of His Life

Mr. Farrell testified that he was born in New Haven, Conn. In 1878, at the age of 15 years, he went to work as a laborer in the New Haven wire mills. After 14 months he worked into a mechanical position and continued thus employed until 1882, when he became a wire drawer at the Oliver Wire Co.'s mills in Pittsburgh. He became foreman of the mill and in 1886 became salesman, traveling throughout the country and selling diversified wire products. In 1889 he became sales manager for the Pittsburgh Wire Co., selling both into the east and abroad. At that time he made an exhaustive study of the requirements of the foreign markets, as he saw great possibilities in that department.

In 1893, Mr. Farrell became general manager of the Pittsburgh Wire Co. and while in this position lived within a stone's throw of the mills. In 1899 a controlling interest in the company sold to the American Steel & Wire Co. of New Jersey. The company was capitalized at $360,000, and was sold at $250 a share. Said the witness:

"I always felt that the concern was sold for $60 per share less than I considered the value of the property. I owned 100 shares. We thought the plant worth one million one hundred thousand odd."

Duties as General Manager

Mr. Severance then took up a line of questioning tending to develop Mr. Farrell's duties as general manager. He testified that he purchased all raw materials of two or three hundred different kinds, becoming familiar with all of them and their prices. He continued:

"After the acquisition of the Pittsburgh Wire Co., my brother, William H., and I were approached by financial interests who desired to invest $2,000,000 in a new wire industry, but I had had experience with a close corporation and preferred to take chances with a large concern. Then John W. Gates telephoned from New York and offered me a position as foreign sales agent for the American Steel & Wire Co. I came to New York to take the position in February. My office was in this room.

Study of Foreign Markets

"When the United States Steel Corporation was formed, it immediately commenced to study the foreign markets, and carried on selling organization up to the time of the formation of the United States Steel Products Export Co. I had charge of the selling organization and sold the goods of practically all subsidiaries. The Products company was formed in October, 1903, as a subsidiary of the Federal Steel Co., and I became president. I always kept in touch with the domestic business, as this was necessary in order to operate intelligently in the foreign business, and I knew what all competitors of the Corporation were doing."

"Are you a director of any company of the many that have dealings with the Corporation?" asked Mr. Severance.

"No. I am not a director of any company excepting the Steel Corporation and certain of the subsidiaries."

"You have charge of the selling of products, of manufacturing, of purchase of raw materials and transportation of commodities, have you not?" was asked.

"Yes."

No Directors Interfered

"During the time you have been in charge of this business, have any of the directors ever interfered or taken part in any way in selling products of the Corporation?"

"I have never sought nor received such assistance," was the reply.

"One or two Corporation directors have at times been directors of the International Harvester Co. Is that company a large consumer of steel products?"

"It is a large consumer, but a small consumer of the Steel Corporation, having purchased only 10 per cent of its needs from the Corporation. Its requirements are 150,000 tons per year, and it gets this steel mostly from the Wisconsin Steel Co., one of its companies. The Harvester company purchased only 56,000 tons from the Illinois Steel Co. from 1903 to 1912, inclusive. The Carnegie Steel Co. sold 30,850 tons to the Harvester company in that time. During this period the Illinois Steel Co. sold to competitors of the Harvester company 872,000 tons of steel products."

President Farrell produced an exhibit on freight rates. It showed that the export freight rate from Pittsburgh to New York advanced from 9½ cents to 10½ cents per hundred pounds in 1907. About 80 per cent of the Corporation's steel exports come from the Pittsburgh mills. Rates on iron ore from Lake Erie ports to Pittsburgh have been reduced 11 per cent since 1900 and this affects the earnings of the Bessemer & Lake Erie railroad, a Steel Corporation subsidiary. A lake reduction of 5 per cent has been made to the Mahoning and Shenango valleys, where important competitors of the Corporation are located. A like reduction of 20 per cent in rates has been made to the Wheeling, W. Va., district, where there are other

large competitors. The exhibit showed an increase of 13 per cent on the average in bituminous coal rates from Pittsburgh to various points. The Bessemer & Lake Erie railroad hauls coal to lake ports but not to points where steel plants are located, and subsidiaries of the Corporation have to pay these rates on their very large traffic. In the case of Connellsville coke rates, an average increase of 12 per cent has been made to various points since 1901 and the Corporation ships 40,000 tons over trunk line railroads daily. On limestone from places on the Pennsylvania lines and other roads, freight rates are 10 per cent higher on an average than in 1901. Rates on billets from Pittsburgh to eastern points are about 9 per cent higher than in 1901, but the Steel Corporation does not ship many billets to the east. Rates on finished iron and steel products from Pittsburgh to eastern points are about 18 per cent higher than in 1901, and from Pittsburgh to western points about 18 per cent higher. Of the latter, the Corporation ships 40,000 to 42,000 tons daily. New York is a large consumer, but the Bethlehem Steel, the Phoenix Iron Co., and other nearby mills do most of the New York business.

Extensive Export Plant

President Farrell submitted a table showing that the value of the Corporation's exports from 1904 to 1912 has increased from $31,000,000 to more than $91,000,000, while its total tonnage increased from 1,123,000 to 2,537,000 tons. This showed that the value has increased in greater ratio than the tonnage, due to its selling more finished products and less raw and semi-finished material. Said President Farrell:

"We have agencies in upwards of 60 countries; we have 268 foreign agencies, 20 of which are large offices like at London, Antwerp, Paris, Copenhagen and Stockholm. Ten thousand tons of material, principally pipe, are carried at Antwerp, as this is a great distributing point. We sell some rails for street railways in Belgium. Other warehouses are at Johannesburg, Sydney, Copenhagen, Barcelona, Singapore, Straits Settlements, Valparaiso, Callao, Rio Janeiro and about 40 altogether abroad. At these points we carry nearly everything that we manufacture in finished materials.

Vessels are Chartered

"We move products largely in ships that we charter. At the present time we have about 35 vessels under charter—bound to all parts of the world. We sell products as far north as Iceland and south to Punta Arenas, Chile, and the South Sea Islands. We are now sending bridges to Christmas Island, lying between the Hawaiian islands and the equator. We do quite a business in the Fiji islands and have offices at Melbourne and Fremantle, Australia. Our men in these offices are almost entirely Americans. We have a civil service system and men are selected for their aptitude for work in these countries. They speak the language of the natives. For instance, our man at Batavia, Java, speaks English, Dutch, Chinese and Malay; our agent at Bombay speaks Hindustani, English and French.

"In our London office we have 35 employes. We do not ship to London for trans-shipment; we have a small warehouse there for rail bonds and specialties which are typically American products. We sell woven wire fence into Great Britain."

Products Variety Gets Trade

"Does a corporation like the Steel Corporation which manufactures a large variety of products, have any advantage over a corporation whose products are limited to one or two or three lines in doing a foreign business?" asked Mr. Severance.

"An enormous advantage," replied President Farrell.

"In what does that advantage consist?"

"Well, in case of a railway in Brazil working under concession from the Brazilian government, the concession generally stipulates that all rails and fittings to be used must be shipped together; we can include fish plates and everything else in a shipment on one vessel. We have been able to develop our business because we can offer a diversified line of products from one source. If the Corporation had not been formed, its subsidiaries could never have worked up the foreign trade separately to the present degree. We had an exemplification of that in the Pittsburgh Wire Co. At the time of the formation of the Steel Corporation, it was costing various subsidiaries that were doing foreign business between 7 and 11 per cent. It cost the National Tube Co. 8½ per cent on the invoice value of the shipments. At the present time it costs eight-tenths of 1 per cent to do our foreign business.

Reducing Export Costs

"In 1905 we started in and it cost us 3 per cent the first year and it has been gradually getting smaller. We expect to get it down to one-half of 1 per cent. A manufacturer selling only a single line of goods would not have the proper selling facilities. A tin plate manufacturer could not afford to establish an office in Valparaiso to sell a few dozen boxes of tin plate a year. It is owing to the great bulk and diversity of products that we are able to offer through our various offices that we are able to do this large business. The American Steel & Wire Co. and the Carnegie Steel Co. could not have established all these offices owing to their cost. Also, one product sells another in the export business. For one Costa Rican railway we furnished everything for this reason, and the material went down there in two or three vessels. We built the first steel structure in South America in Buenos Aires. Since then we have built every steel structure in Buenos Aires and have our own erecting force there. We were able to interest them because our structures were not as bulky as those offered by European fabricators. The Carnegie Steel, American Sheet & Tin Plate, American Steel & Wire, National Tube, American Bridge and Lorain Steel companies contribute to our South American trade. We commenced to develop the export business from the Tennessee Coal, Iron & Railroad Co.'s plant in 1908 and are selling some material into Mexico from Birmingham, Ala.

"We sell 60,000 tons of wire products a year through our Montreal office; also quantities of sheet steel and tin plate, mine rails and some standard rails, the latter when rolling mills in Canada and England are busy. We are rolling 25,000 tons of rails now which will cost $53.67 a ton delivered at Calgary. Rail makers at Middlesboro, Eng., or Barrow could land rails at Montreal for $1 or $1.75 a ton, while our rate is $3.40 a ton. The English makers also get one-third of duty off.

"At Johannesburg, South Africa, we sell large quantities of pipe to diamond and gold mines, and large quantities of light mine rails. Our Cape Town office sells material to the agricultural communities. In Nova Scotia we sell structural material, special sections for mine timbers which, like a steel oil rig that we manufacture, is being bought all over the world. We sell a considerable quantity of wire products through the Rio Janeiro office, also rails and railway accessories, corrugated steel, tin plate and street railway materials. We do quite a business along the

Higher Freight Rates Added to Costs

An interesting exhibit filed by counsel for the defense on Monday showed that there was a general increase in the cost of transportation during the years 1901 *to* 1907, *inclusive.*

In export freight rates, Pittsburgh to New York, there was no material change.

On iron ore from Lake Erie ports, rates to various points in the Pittsburgh and Wheeling districts and in the Mahoning and Shenango valleys were reduced during the period on an average of 12 *per cent for each point.*

On bituminous coal, from Pittsburgh, the average increase in rates to various points of consumption was 13 *per cent.*

On coke the average advance in freight rates was 12 *per cent.*

On limestone the average increase in freight rates was 10 *per cent.*

On billets the average increase in freight rates from Pittsburgh to various eastern points was 9 *per cent.*

On billets from Pittsburgh to western points there was an average advance of 10 *per cent.*

On finished iron and steel products, the freight rates from Pittsburgh to various eastern points were increased on an average of 18 *per cent.*

On finished iron and steel products, the rates from Pittsburgh to various western points were increased on an average of 18 *per cent.*

On pig iron the freight rates from Pittsburgh to various eastern points increased on an average of 13 *per cent.*

On pig iron the freight rates from Pittsburgh to various western points increased on an average of 14 *per cent.*

This exhibit was filed to show that advanced freight rates were an important factor in advancing the cost of iron and steel products for the period under consideration.

north coast of Africa through our office in Tangier. We do about $4,000,000 worth of business a year in China. The Chinese buy large quantities of discarded material—'defectives,' we call them—and fashion them up in a very clever and commendable way. They make very good safety razors from low-carbon steel wire rods. They even buy old horse shoes. In Sao Paulo, Brazil, we sell large quantities of woven wire and corrugated steel, light rails and all sorts of pipe and tubing products. We sell large quantities of tubular products for deep well borings and to gas companies in Australia.

How Australia Does Business

"The American Bridge Co. has not done business in Australia for the last two or three years. We formerly sold a considerable number of highway bridges in Australia until they established a bureau called the 'Intelligence Department'. Wherever they could gather up our invoices, giving details of our business, dimensions, prices, and all that sort of thing, they promptly sent them over to manufacturers in Great Britain. The preferential tariff of 5 per cent and that sort of practice, has gradually resulted in a dwindling of our business in what we call highwater bridges. We are now estimating what will probably be one of the largest bridges in the world that will probably cost $11,000,000 or $12,000,000. We have been invited by the New South Wales government to send our designs there for that purpose.

"The office at Valparaiso is the main one of our Chilean offices; we have eight or nine offices in Chile. The products are largely corrugated steel and wire products, considerable wire rope for aerial tramways for the nitrate mines, tubular products for the nitrate mines, tin plate for canning, etc.

Must Run Own Vessel Lines

"The British Columbia business, that is, our Vancouver business, has been rather a difficult proposition to work out. Freight rates from Pittsburgh to Vancouver on our products are $18 a ton. The freight rates from Liverpool or Antwerp by steamer—and there are six lines of steamers running out there—vary from $6 to $7 a ton. Probably during this recent boom in ocean freight it has gone up to $9 a ton. After we had established an office there and opened a warehouse, we found it impossible to do very much business unless we started a line of steamers. We operate a line of steamers from New York to Vancouver via the Straits of Magellan, and stop at various places like Guaymas and Mazatlan. We have been furnishing material for the last two or three years for building a railroad in Colombia from Buena Ventura to Cauca and then across to Bogota. These steamers are the only steamers from this country which go to that port. We have also been carrying considerable quantities of material for other manufacturers in this country who have been unable to develop a business because of the lack of transportation facilities. These steamers sail from here about every two months with full cargoes of steel, excepting that occasionally we carry materials for anybody that has them to ship. Some of our vessels are now going on to Prince Rupert. We have secured a contract for building docks there.

Must Provide Round Trips

"Then we go into the merchandise business to get the ships back here again to load them out with steel. The steamers are chartered out for lumber or coal to the Gulf of California. They go to a place called Santa Rosalia and load full cargoes of copper matte, then to Dunkirk, France, to discharge this copper. They are then chartered again to bring them across the Atlantic ocean. They generally come over loaded with chalk, occasionally with other commodities. We are bringing over a cargo of tin plates in one of these from Swansea, Wales. The round trip takes seven and half to eight months. There are six vessels in the business.

"In Trieste, Austria, we sell wire products, principally, and some pipe. In the Holy Land, we sell mostly wire nails for boxes for dates, figs, etc. We sell large quantities of pipe for oil wells in Jamaica and Trinidad. The Leaward Islands and the Bahamas take general lines of products furnished by the American Bridge, American Steel & Wire and Lorain Steel Companies. We do considerable business in Bulgaria in wire products, some pipe and steel sheet.

"In Central America we do business in San Salvador, Costa Rica, Nicaragua, Venezuela, Guatamala and Honduras. Wire products, galvanized steel, some tin plate, a considerable quantity of light rails for the plantations, pipe and bridge material go to that region.

"We do a general business in Cuba of about $5,000,000 a year, materials for sugar grinders, railway materials, corrugated steel for buildings, pipe, street railway and building material. In Cyprus, we sell mostly fine wire products."

Sent in Roundabout Way

President Farrell told how the Steel Corporation formerly sent goods for Mediterranean ports by way of Hamburg and the Dutch Levant Line. As a result of the business of the Corporation there, an American Levant Line was started with steamer every six weeks, and this is now available to other American shippers. He continued:

"In Greece we have an agent. We sold gas pipe there for a number of years to the Athens Gas Light Co. We have sold considerable quantities of wire products, sheet steel, and some other materials. In the island of Hayti, at the present time we are furnishing the material for constructing the Haytien railway.

"We have two agents at Honolulu; one sells bar steel and horse shoes and general Carnegie Steel products, while the other sells wire products, sheet steel and tubular products. We have built the Pearl Harbor derrick in the Hawaiian islands for the government.

"In Italy we have an office at Milan that handles pipe exclusively and an office at Genoa which we established for developing business in Tennessee Coal, Iron & Railroad Co.'s foundry pig iron, they being a large market for foundry iron, and favorable opportunities exist to ship iron there in cotton-carrying vessels. We do a large business in Japan, about $6,000,000 worth a year. There we sell wire nails, about 300,000 kegs a year, considerable pipe and large quantities of railway materials, bridges, light sheets and some tin plate. We frequently have 25,000 tons a month to move to Japan, and regular steamers will take about 3,000 tons in a ship, and there are four ships a month. That leaves about 12,000 tons for which we have to go out and charter ships.

"We have an agency in Korea and one in Ceylon. On the Island of Mauritius we sell sheet steel, wire products, pipe and some wire nails. In New Zealand we sell principally wire products. A preferential tariff of $5 a ton in New Zealand in favor of Great Britain effectually keeps us out of that market in everything except high grade products. In Norway we sell high-carbon steel wire for bailing wood pulp. We have an agent at Halifax, N. S., and one at Yarmouth. We have agents in Porto Rico. In Lisbon we sell pipe, usually, and we do business with the Madeira and Azores islands from Lisbon.

Dots Globe with Offices

"We have an office at Bucharest. In Sweden we sell largely galvanized sheets, pipe, and some wire products. In Scotland we sell woven wire fencing, also rails. In Tasmania we sell considerable quantities of galvanized sheets, some wire rope for the tin mines, and considerable quantities of tin plate. We have a large office in Constantinople. We sell wire products there, pipe and railway and bridge material. In Uruguay we sell railway materials, galvanized sheets, large quantities of wire products and some pipe and sheet steel. The agents in Venezuela are located at different places; some sell corrugated steel, some barbed wire, some bar steel and some pipe. A catalog was compiled shortly after the formation of the Steel Products company and printed in various languages, and copies were sent to our various offices. This has been reprinted from time to time. We do business in every market in the world in accordance with the customs existing in those markets. We always sell in weights, measures and in moneys current in that market in which we are doing business."

Difficulties of Export Business

President Farrell told about some of the difficulties of doing business in foreign countries. He pointed out that a great many projects are financed by European bankers and these banks stipulate that the materials shall be bought in the country where the financing is being done. He added:

"We have not operated under any 'pools' or agreements with foreign manufacturers or competitors, neither as to prices nor location."

"What is the fact as to whether or not you have had any 'pools' or agreements with domestic manufacturers as to foreign trade?" was asked.

"We haven't had any—our office is an encyclopedia for manufacturers of the United States, particularly in iron and steel and collateral lines. We have never hesitated to give information with regard to trade conditions in various countries, and the credits of people with whom we may have been doing business, and especially as to facilities and information generally with regard to tariffs in the various countries, and railway facilities, for internal distribution, and information generally.

Even Loaned Salesmen

"We have even distributed catalogs for customers, and we have loaned our salesmen in different countries for short periods to some manufacturer who may be interested in developing some trade of some kind in his line of goods."

"What, if anything, has the Steel Corporation done in the way of furnishing raw or semi-finished materials to American manufacturers of finished goods, below current mar-

STATEMENT OF TOTAL EXPORT SHIPMENTS OF U. S. STEEL CORPORATION, 1904 TO 1912, INCLUSIVE

Year.	Net tons.	Value.
1904	1,123,322.6	$31,388,138.86
1905	1,052,258.9	32,680,700.45
1906	1,258,370.0	43,883,874.90
1907	1,099,934.2	47,236,326.60
1908	857,860.3	33,322,499.06
1909	1,120,442.8	41,060,920.77
1910	1,423,070.5	53,104,499.69
1911	1,918,387.3	69,548,905.55
1912	2,537,435.9	91,984,239.15
	12,391,082.5	$444,210,105.03

ket prices, so as to enable them to get into the foreign markets?"

"We have done that pretty generally to manufacturers," was the reply. "The value of what we sell annually under such conditions is $50,000,000. We are now shipping to the port of Baha de Caraquiz, Ecuador, the port of Buena Ventura, Colombia, Guaymas and Mazatlan and British Columbia ports. We are now sending, or have to send, a considerable quantity of material to Prince Rupert, British Columbia, the terminus of the Grand Trunk Pacific railway. There are no steamers from this country going to Prince Rupert; consequently it is necessary for us to hire vessels."

"You spoke of chartering—I think you said about 45 vessels?"

Continually Chartering

"We have from 30 to 40 vessels under time-charter all the time. These vessels go to various parts of the world with various cargoes. We have some carrying 30,000 tons of pipe to Roumania; we have an order from the West Australian government for 18,000 tons of rails which we are chartering vessels for; and our business generally requires us to have a number of chartered vessels in commission all the time."

"Do you sell, and has it been your practice to sell, all your goods in foreign countries at a lower price than you get in this country?"

"No; as a matter of fact, we obtain higher prices on some commodities in some markets."

"Mr. Farrell, what advantage is possessed by a corporation doing a continuous foreign trade, as distinguished from one that uses foreign business for 'dumping' purposes?"

"It is impossible to develop a foreign business unless it is done continuously. Buyers will not patronize people who are not in position to give them continuous service or supply. We had in the early history of the Corporation to live down the 'dumping' business, which was quite prevalent prior to the formation of the Steel Corporation. And you must furnish the requirements of the markets, and not attempt to foist upon the buyers something you would like to sell and not what they desire to buy. After having made a study of the markets of the world, we manufactured the materials in accordance with the requirements of the markets, not only as to gages and qualities, weights and measures, but as required by them. It required enormous expenditures for changes in our mills. The business has been prosecuted continuously.

Corporation Does the Bulk

"Five mills of the American Steel & Wire Co. operate entirely on foreign business. One is at Allentown, Pa., one at Donora, one at Braddock, the H. P. works at Cleveland and the American works at Cleveland. In our class of goods, 90 per cent of the export business of the country has been done by the Steel Corporation. Other manufacturers have only concerned themselves with foreign trade when the domestic trade was insufficient to keep the mill capacity employed. We now have upward of 40,000 men employed in the manufacture of goods for export. It is impossible for us to enter Russia, Austria, Germany or France, as the tariff duties are prohibitive."

Strikes by miners on the Cuyuna, Minn., iron range have been settled. The companies refused to increase wages and the 900 strikers returned at the old minimum rate of $2 a day.

BRITISH CONDITIONS

Closely Resemble Those in the United States—Institute Meeting.

The prospects of business in the British iron and steel trade constituted the principal theme at the annual dinner of the Staffordshire Iron and Steel Institute, held at Dudley, Eng., April 26. This institute, which claims to be the pioneer of all similar bodies the world over, reported a membership of 333, and the meeting elected Frank E. Nurse as its president for the coming year; Mr. Carder, the secretary, and James Piper, the treasurer, being re-elected.

George Hatton, who is not only the head of Lord Dudley's great Round Oak steel works, but is president of the Dudley chamber of commerce, dwelt at some length on trade prospects. The iron trade had, he said, been going through a very prosperous period. The manufacturers had learned by experience that trade passed through cycles of alternate depression and inflation. There was no doubt they had had a period of high barometer, both as regarded volume of business and remunerative prices. At the present moment, they had reached a pause in the trade. People were very anxious to know what was going to happen, and whether they had come to the end of the prosperous period, and were now on the down grade. He did not hold that view, but thought they had merely come to a breathing time, which was a very necessary thing. For the last two months, there had been very little buying. That was simply because everybody had bought, and had got contracts. Secondly, prices were high, and the probability of them going higher was not so great as the possibility of their becoming easier. Consequently, there was no incentive to buy. But they might accept as a very consoling fact, and as an assurance that the boom was not going to end, the fact that all the iron was going into consumption. People who had bought were taking material and consuming it as rapidly as ever. The ship building trade was as active as ever, and people whose contracts were running out would have to buy again, though, perhaps not in such large quantities. It was not a time to be despondent about trade. Apparently, the price of fuel would become higher. It was true some trades were having rather more than a pause, and the tin plate trade at present was really bad. But that could be easily accounted for entirely by the troubles in the near east. Formerly, the trade had a large market there for oil and petrol tins, which for the time had been entirely cut off. But with peace restored that trade would begin again, and that would right itself. As to general trade, there was nothing to support the idea that the trade was on the down grade. Then, further, they had had for four or five months a very high bank rate, which was now reduced, and easier money would mean easier trade. As to labor disputes, it was the duty of employers to take a reasonable and sensible view of wages.

TWO COMPANIES

Will Locate and Erect Plants at Indianapolis, Ind.

Two large manufacturing concerns, the Crawford Locomotive & Car Co., Streator, Ill., and the Miami Cycle & Mfg. Co., Middletown, O., have announced their intention of locating in Indianapolis.

The Streator concern will occupy a site of 100 acres at Mars Hill, a new industrial suburb, west of the city. About 25 miles of tracks will be built, and buildings covering several acres, erected. The company expects to be operating its new plant in about four months.

At Streator, the company has had difficulty in getting sufficient labor. It is employing between 400 and 500 men and in its new plant will employ at least 300 more. Ultimately the company expects to employ about 2,500 men, as it will begin the manufacture of all-steel freight cars and later of all-steel interurban and railway passenger cars. At present the company has orders for about $500,000 worth of work in hand.

The Miami Cycle & Mfg Co., which manufactures motorcycles, is to open a plant there because of the inability to get enough labor and because it has outgrown its Ohio plant. A lease has been taken on one-half of the old plant of the Prest-O-Lite Co., on East South street. This will be occupied until the company can erect a plant at Speedway, in the northwest part of the city.

About 800 men will be employed. Until the new plant at Speedway is erected, the company will manufacture motors, two-speed hubs and brakes, in Indianapolis, to be shipped to Middletown for assembly. For the 1914 season, the company contemplates building about 25,000 motorcycles. The Middletown plant is to be continued and a five-lap testing track will be built in that city immediately.

Redfield Would Grant Manufacturers Time

In Which to Dispose of Products Made Under the Protective System—Uuderwood Bill Will Have Stiff Opposition in the Senate

Opposition of a purely perfunctory nature, made by Republicans in the house to the Underwood tariff bill has given way in the senate to what will be a decidedly sharp contest. The initial fight was made in the senate last Friday, following its passage the previous evening in the house.

The struggle was precipitated by Senator Penrose, Republican, of Pennsylvania, when he made a motion that public hearings, opposed by Democratic leaders, be held on the bill. Five Democratic senators at that time favored the Penrose motion, and it would have carried then had it been put to a vote. Debate closed on it, however, with the end of the "morning hours." In the meantime, at least two of the rebellious senators, Martine, of New Jersey, and Sheppard, of Texas, have been brought back into the party line. The other three are Senators Ransdell and Thornton, of Louisiana, who are opposed to and will vote against the bill because of the sugar schedule as proposed, and Senator Lewis, of Illinois. Mr. Lewis may yield to persuasion, and vote against the Penrose motion when it is again offered with the convening of the senate, which adjourned from Friday until today. Mr. Lewis' vote, though, will not be a determining factor. Victory for the Democrats is assured with the return of Senators Martine and Sheppard to the fold. This means no public hearings will be held. The bill, perhaps, will remain in the senate finance committee ten days or two weeks, and then be reported back to the senate.

Out of several amendments to the Underwood bill proposed to Senator Simmons, chairman of the finance committee, and Representative Underwood, three are considered especially important. Coming as they did from the president's cabinet, their adoption would not be surprising. Secretary of Commerce Redfield has proposed in an amendment that reasonable time should be allowed for the manufacturers to sell out products made under the protective system before they were forced into competition with foreign markets. No date was fixed, but it perhaps means the provision would become effective in a month or so after the enactnent of the new law. Attorney General McReynolds and Secretary of the Treasury McAdoo have proposed an amendment reposing in the secretary of the treasury the right to appraise imported goods for the purpose of assessing ad valorem duties, regardless of fluctuating markets. It is thus proposed to approximate the ad valorem system to the advantage of specific duties, and reduce litigation and work of appraisers. Another amendment proposed by the treasury and department of justice would make it unlawful for any person to take up appeals from appraised valuations on a contingent fee basis.

The warning to manufacturers of the country against threatening their laborers with wage reductions, sounded by Majority Leader Underwood on the day the bill passed the house, is held by his opponents to be a virtual self-conviction of the measure as a piece of bad legislation. They contend it preconceives industrial stagnation. The announced plan of pressing into service for the first time in the annals of the nation an inquisitory power to investigate internal affairs of institutions is looked upon as a club which possibly cannot be effective. Not only is it held as a punitive rather than a preventative measure, but it is claimed by the Republicans that it will be unable to stay the law of economics which will compel shut-downs, wage reductions and the laying off of workingmen. It is also argued that the Bureau of Foreign and Domestic Commerce, or any other agency for that matter, has no constitutional right to go within state lines and scrutinize private business.

Put through the house in the shortest period, with the most "decorum," and the least number of changes of any similar bill in the country's history, the tariff measure passed at 6:10 o'clock. Argument took up the afternoon of the final day. Mr. Underwood made a point of order that the motion, made by Minority Leader Mann, relating to a tariff commission, was not germane and the chair sustained him. Mr. Mann had asked that the bill be recommitted to the ways and means committee with five distinct changes. One proposed the substitution of specific for ad valorem rates. The bill passed by a vote of 281 to 139. With a majority of 141 over the combined opposition of Republicans and Progressives, there were only 12 members absent, out of the entire membership of 433. Two Republicans, four Progressives and one Independent voted for the bill. Its passage was followed by a mild demontration.

Underwood's Threat

"The statement has been made that this tariff bill will react on labor and affect the wages of laboring men. I give notice now that when the men from whom you bring that message endeavor to grind labor in the interest of Republican politics, there is a bureau (Bureau of Foreign and Domestic Commerce) of this government that is going to ascertain the reason why."—Majority Leader Underwood in house on day of passage of bill bearing his name.

Burton Objects

Washington, May 13.—Notice has been served upon Democrats by Senator Burton, Republican, of Ohio, as a minority member of the senate committee on commerce, that the confirmation of Joseph E. Davies, Madison, Wis., to be commissioner of corporations, would be fought and held up unless Mr. Davies resigned his place as secretary of the Democratic national committee. The majority committee, however, ordered a favorable report.

Still Seeking Information

Washington, May 13.—Before signing the sundry civil bill, which passed the senate last Wednesday, President Wilson is seeking further information regarding the clause exempting labor organizations and farmers' associations. Senators Pomerene, of Ohio, and Thomas, of Colorado, were the only Democrats who voted against the bill. Senator Root made a strong attack on it because of the exemption feature.

Gompers Will Appeal

Washington, May 13.—Plans for appeals which he will make to the United States Supreme Court in the case of Samuel Gompers, president of the American Federation of Labor, John Mitchell, one of its vice presidents, and Frank Morrison, its secretary, have been outlined before the court of appeals by Attorney Jackson H. Ralston.

OBITUARIES

Oliver A. Houn, aged 80, who conducted a foundry at Addison, N. Y., for many years, died recently.

Frederick Hartman, former president of the Hartman Foundry & Iron Works, Grand Rapids, Mich., died recently at the age of 81 years.

Franck C. Fluegal, a director in the Anton Fluegal, Inc., Iron Works, Brooklyn, N. Y., died recently in St. Catherine's hospital, Brooklyn.

Charles W. Agard, for 30 years superintendent for the Philadelphia & Reading Coal & Iron Co., at New Bedford, Mass., died recently at the age of 65 years.

Peter Kirkevaag, for 30 years mechanical engineer for the William Tod Co., Youngstown, O., died unexpectedly, May 6, aged 65 years. About a year ago he left the William Tod Co., to go to the Brier Hill Steel Co.

Captain William Kerby, president of the Wm. Kerby Co., 106 Beekman street, New York City, manufacturer of stoves, died at his home in Brooklyn, May 5, aged 56 years. He had been active in the service of the national guard for many years and was brevetted major.

Daniel Simonds, president of the Simonds Mfg. Co., Fitchburg, Mass., who died last week, was 65 years of age. He became associated with the Simonds company, following the incorporation in 1868. He became successively superintedent and vice president and in 1888 was made president.

John R. Cameron, first general superintendent of the Colorado Iron & Fuel Co., Pueblo, Col., and former general superintendent of the Cambria Iron Co., Johnstown, Pa., died recently, aged 65 years, at Pueblo. Mr. Cameron went to Pueblo in 1882 from Johnstown to take the general superintendency of the Colorado Coal & Coke Co., which afterwards became the Colorado Fuel & Iron Co.

Moses Weil, one of the best known iron and steel brokers in Philadelphia, died May 6. He did business for a great many years at 837-41 North Third street, that city, under the name of Morris Weil. He was born in Chester, Pa., 46 years ago, and at an early age entered business with his father, Morris Weil. He succeeded the latter in the iron and steel brokerage business following his death two years ago.

Francis M. Rites, inventor of the Rites governor for steam engines, was found dead at his country home in Slaterville, near Ithaca, N. Y., May 8. He was living alone at his country place. At one time Mr. Rites was chief engineer for the Westinghouse Machine Co., Pittsburgh. His invention of the Rites governor netted him large royalties yearly. When gasoline engines came into use, Mr. Rites also patented a governor for this type of equipment.

James Cooper Bayles, who was editor of *The Iron Age* from 1870 to 1889 and was prominent as an engineer and a journalist, died at the New York Medical College hospital, May 7, at the age of 68, after an illness of but five days. Early in his career, he was connected with the Delamater Iron Works, in New York City, and was on the engineering staff of the Raritan & Delaware Bay railroad. In 1865, he became connected with the New York *Citizen* and from 1868 to 1869 was editor of *The Commercial Bulletin.* He was once president of the health department of New York City. Of late years, he devoted his time to writing on technical subjects. Mr. Bayles received the degree of Ph.D. from Rutgers College and was the recipient of many other honors. He served as president of the American Institute of Mining Engineers in 1884 and 1885. He was a charter member of the American Society of Mechanical Engineers and a member of the Iron and Steel Institute. In 1886 he was elected non-resident lecturer in the Sibley School of Engineering, Cornell University.

SMALL DECREASE

In Ore on Dock—Winter Shipments Heaviest Since 1907.

The amount of ore on Lake Erie docks, May 1, according to statistics gathered by *The Marine Review,* was 5,706,477 tons, compared with 5,881,245 tons in 1912, a decrease of 174,768 tons. The total is more than 1,000,000 tons less than the dock balance on May 1, 1911.

Total rail shipments to furnaces from Lake Erie ports during the winter season (Dec. 1 to May 1), were 3,790,691 tons, the heaviest since 1906-1907.

The amount shipped to furnaces during the navigation season of 1912, was 33,849,930 tons. The entire movement of ore to furnaces over Lake Erie docks during the year ended May 1, 1913, was, therefore, 37,640,621 tons. This compares as follows with years ending May 1:

Year.	Tons.
1912	26,428,799
1911	32,542,654
1910	33,764,842
1909	20,637,084
1908	31,845,603
1907	31,983,546
1906	29,446,561
1905	20,195,286
1904	18,739,995
1903	21,905,251
1902	17,216,065
1901	14,468,260
1900	15,882,881

The following table gives the amount of ore on dock at the close of navigation last year and the opening this year:

Port.	May 1, 1913.	Dec. 1, 1912.
Buffalo	139,624	340,261
Erie	449,455	661,330
Conneaut	135,000	1,429,533
Ashtabula	2,105,817	3,350,553
Fairport	357,995	565,920
Cleveland	1,428,306	1,888,560
Lorain	399,705	320,713
Huron	293,006	385,810
Sandusky	2,485	2,472
Toledo	394,984	552,016
	5,706,477	9,497,168

Out of total movement of 866,337 tons of ore during April, 262,047 tons went to Lake Erie ports, distributed as follows:

Port.	Gross tons.
Buffalo	64,168
Erie	2,953
Conneaut	50,185
Ashtabula	43,355
Fairport	.....
Cleveland	75,584
Lorain	.....
Huron	8,501
Sandusky	.....
Toledo	8,530
Detroit	8,771
Total	262,047

Coke Oven Contract

The Cambria Steel Co., Johnstown, Pa., has contracted with the Gas Machinery Co., Cleveland, for a battery of 28 by-product coke ovens. The Cambria Steel Co. is now operating a coke oven plant of 370 ovens, and expects to substitute for these a more modern type of oven. The contract with the Gas Machinery Co. provides for future installations to a total of 500 ovens.

FOREIGN MARKETS

BELGIAN IRON TRADE

Brussels, May 1.—The iron position in Belgium is beginning to be very sensitive indeed to both interior and exterior circumstances. The period appears to have arrived when the producers feel they want work to do, and as a consequence prices are easy. Bars are now dealt in at £5 11s ($27.02) for both common iron and steel, with £5 15s ($27.99) for girders and £5 18s ($28.72) for rods, £6 1s ($29.45½) for rails, £6 5s ($30.43) for steel plates of ¼ inch and more, £6 6s ($30.67) for thicknesses of ⅛ inch, and £6 10s ($31.64) for thicknesses of 1/16 inch and over. In the provinces the prices are not so seriously affected. Bars make 16 francs steel ($3.04) and 16.50 francs ($3.13) iron; girders remain at 16.50 francs ($3.13). Rods are worth about 15 francs ($2.85), while heavy plates in steel are worth 16.50 francs ($3.13) also. The plates appear to be the most affected by the adverse circumstances. Several contracts have been placed for accessories for the State railways, which were divided amongst a large number of Belgian works. This will give them something to do for the moment. The exports for the first quarter of the year show increases in girders, plates and bars, wrought iron and steel, and decreases in rails, 23,500 tons; nails, wire and rods, the latter making about 28,500 tons, so that balancing decreases on one hand and increases on the other there is only an improvement of 7,000 tons altogether or about 2,500 per month. Wrought iron has lost 1,000 tons.

FRENCH IRON TRADE

Paris, April 1.—There is still an abundance of work on hand in the French iron works; but new business is getting more and more scarce. Anxious eyes are now turned to the east in the hope that the situation there will become less menacing, and that the orders that are known to be waiting may be definitely placed both for railway material and building material—at home and abroad, particularly the colonies. Good business is expected also from the far east, and in fact is anxiously looked for, because foreign orders are now becoming executed and those works that specialize in them are anxious to see more business from far-off quarters. As a matter of fact prices have not been able to stand up against the discouraging aspect of the political horizon. They run as follows, quoting only for Paris and the northern districts: Merchant iron, Paris No. 2, 20-21 francs ($3.80-$3.99); Nord, 18-18.50 francs ($3.42-$3.51); merchant steel ditto for both markets; special steel, 21.50-23.50 francs ($4.08½-4.46½), Paris; 20 francs ($3.80), Nord; sheets, 22-24 francs ($4.18-$4.56), Paris; 20-50 francs ($3.89½), Nord; girders, 22-24 francs ($4.18-$4.56); unquoted for the north; 3 millimeter plates and over, 24-25 francs ($4.56-$4.75), Paris; 22-23 francs ($4.18-$4.37), Nord. Soft rolled steel goods are not quoted. The position generally is relatively the same on the other markets for which quotations are not here made, namely, the Meurthe-et-Moselle, Haute-Marne, Loire, Center, which markets it is perhaps not necessary to quote as they are not so closely in touch with the outside commercial world.

RUSSIAN IRON TRADE

St. Petersburg, May 1.—Although the manufacturing industries of Russia are passing through a moment of depression, this has not extended yet to the iron and machinery business. Prices ruling for iron are: Formed iron, 1 rouble 44 copecks to 53 copecks (73-77½c) per pood (36 pounds); girder iron, 1 rouble 46-56 copecks (74-79c); tank iron, 1 rouble 60-65 copecks (81-83½c); roofing iron, at works, 2 roubles 10-20 copecks (107-112c) ex-works; pig iron, 65 copecks (32½c) per pood at works.

AUSTRIAN IRON TRADE

Vienna, May 1.—The Austro-Hungarian market in respect to metallurgy suffers something after the same form as that of Germany, though as a matter of fact still more intensely, owing to Austria-Hungary being more immediately interested in the Balkan embroglio. This is seen in the returns of the business done by the Austrian metallurgical cartel. There are declines under almost all headings—bars and form iron, girders and plates—but there have been increases in rails to a considerable extent, namely, 89,493 m. q.

GERMAN IRON TRADE

Berlin, May 1.—The political situation continues to exercise a preponderating influence on the metallurgical market in Germany, and although peace seems likely between Turkey and the Allies, fresh differences as the political journals announce, are appearing in other directions. There is, therefore, continuous uncertainty both in the political and business future. Buyers are consequently very reserved and week after week make it felt that they are looking for lower prices. Thus it is that common steel bars are quoted 116-120 marks ($27.26-$28.20) per ton instead of 118-120 marks ($27.73-$28.20) which they were in the preceding week. All the same offers are being made at 115 marks ($27.02½) quite commonly, particularly for deliveries to June 30. The expected relief because of the strike in Belgium has not been felt, and it is not likely now to be experienced as the strike has been officially called off. German importations in metallurgical goods in the month of March amounted to 44,909 tons, value 8,358,000 marks ($1,964,130) against 52,591 tons, value 8,530,000 marks ($2,004,550), in February, and 60,903 tons, value 9,965,000 marks ($2,341,775), in March, 1912. Exports have risen to 602,928 tons, value 126,542,000 marks ($29,737,370), against 501,754 tons, value 105,289,000 marks ($24,742,915), in February last; and 46,904 tons, value 100,382,000 marks ($23,589,770), in March, 1912. Thus the German export trade shows continuous progress; but as this is, of course, under contracts existing previous to the more acute phase of the political situation, the depressing effects of this situation will not be obvious in the returns probably for some months to come.

The Carnegie Steel Co., at the new open-hearth department of the Edgar Thomson Steel Works, will install what are said to be the largest steel ladles ever built. Seventeen 110-ton ladles are being constructed by the Riter-Conley Mfg. Co. for that department.

The Conway shop of the Pennsylvania lines west is being extended by the Riter-Conley Mfg. Co., Pittsburgh. About 300 tons of steel are involved.

IRON MINING NEWS

Iron Mountain Active

Large orders for ore having been booked, the Pewabic Mining Co., of Milwaukee, will operate its properties on a larger scale this season than for some years past. The company owns the Pewabic and Walpole mines at Iron Mountain, Menominee range. Whereas last year 275,000 tons of ore were produced, 450,000 tons will probably be shipped this season. The Walpole is an integral part of the Pewabic, although it has been idle, while the rest of the workings have been in commission. The company's working force is being increased to the extent of 100 men, most of whom will be employed in the Walpole shafts.

The machinery overhauled and the railroad tracks put in repair, Pickands, Mather & Co. have resumed operations at the Vivian mine at Quinnesec, four miles east of Iron Mountain. Twenty-five thousand tons of ore will be produced this season. The output will be hauled to Escanaba by the C., M. & St. P. railroad. The United States Steel Corporation's Chapin mine at Iron Mountain is shipping 5,000 tons daily. Four-fifths of the product comes from the stockpiles. High water in the Menominee river recently has interfered with operations at Quinnesec Falls, where the Steel Corporation is installing a hydro-electric plant in connection with its hydraulic works. The stream rose to a point where it completely covered the cofferdam. Operations are in progress again. Contracts for two 12-foot penstocks and for sixty galvanized iron towers for the transmission line to the Chapin mine have been awarded to the American Bridge Co.

Enlarging Dock

The Zenith Dredge Co. has commenced work on the north side of ore dock No. 1 at Two Harbors, Minn., where a large amount of dredging will be done between the dock and a new retaining wall which was put in by the Duluth & Iron Range Railroad Co. last winter. This additional harbor space when completed will allow the use of dock No. 1, to its fullest capacity, or an addition of 16 pockets over what has heretofore been used. The retaining wall which extends parallel with the dock for a distance of nearly 300 feet was recently completed by Whitney Bros. of Superior.

Opening New Mines

M. A. Hanna & Co., having development work at the Carpenter and Ravenna properties well advanced, is now preparing to open the Monongahela tract, in the same locality. The Monongahela comprises the east half of the northeast quarter of section 36, township 43, range 33, in the Crystal Falls country, Menominee range. It contains a deposit which is a continuation of that being opened at the Carpenter. A prospective mine is on the property the Cleveland Cliffs Iron Co. is exploring in section 12, township 42, range 33, north of the big Mastodon find of the Longyear interests and in proximity to that of the Steel Corporation in section 12. Ore has been encountered by the diamond drill and in at least one hole is more than seventy feet thick. The old Lotta property in section 28 is being given another test. The exploring firm of Scott & Luntz is at work and is operating a diamond drill. The Lotta is owned in fee by ex-Senator M. H. Moriarty and ex-Mayor R. B. Webb of Crystal Falls, from whom the explorers have procured an option.

The Florence Iron Co., composed of the Ladenberg-Thallman interests of New York, has resumed exploratory work in section 36, township 44, range 33, north of Crystal Falls. A diamond drill is in commission. Exploration was in progress most of last year, being suspended temporarily during the winter. While all of section 36, is transversed by the Hemlock formation, this latter is long and narrow and the overburden is heavy. Exploration is therefore tedious work. It is considered highly probable that somewhere in the lands being tested ore exists in quantity. Some five miles to the northwest, Pickands, Mather & Co. are developing the Warner property. A shaft has been sunk, a good start made in opening underground workings and a substantial plant of machinery installed. The Warner will ship for the first time this season. The mine lies between the Gibson and Michigan properties and produces an ore similar to that procured at the Hemlock, a mine of Pickands, Mather & Co. to the north.

Corrigan-McKinney Mine Idle

The ore remaining in stock at Corrigan-McKinney Co.'s Crystal Falls mine has already been shipped this season, but there is no present intention of restoring the property to the producing list. The Crystal Falls has been idle for several years. The shaft is in poor condition and, while the state tax commission estimates the ore remaining in the mine at half a million tons, the ore lies at a depth greater than 1,000 feet, and it is a question whether it would pay to go to the expense of taking it out. The property has produced in its day nearly 1,800,000 tons. Much of this ore carried the largest percentage of phosphorus of any product ever mined in the Lake Superior region, running about 0.80 per cent—nearly 20 pounds of the phosphorus in a gross ton of ore weighing 2,240 pounds.

Provided ore is found in considerable quantity in the adjoining 40-acre tract, a new lease of life is in store for Corrigan, McKinney & Co.'s Dunn mine, in the Crystal Falls field. An option on this "forty," the southwest quarter of the southeast quarter of section 36, township 43, range 33, has been procured from the Michigan Iron & Land Co. and exploration from the bottom levels of the Dunn is in progress. It is known that the ore makes in a northwesterly direction and dips into the M. I. & L. tract; the question is whether the deposit is large enough to warrant development. The Dunn, itself, is practically exhausted. The mine is 1,500 feet deep and up to the boundary line about all the ore has been taken out. The ore in the adjoining forty can be mined profitably from the present workings, provided the deposit is sufficiently large, while it is questionable whether the development of the tract from the surface would pay.

Another little mining town is springing up in the Iron River district of the Menominee. This is at the new Bengal property of Pickands, Mather & Co. A dozen dwelling houses, alternating in size and style, some of two stories and others of one, have been erected for the accommodation of employes, and more will be built.

MEN OF THE IRON TRADE

PETER DIETZ, consulting and designing engineer, has opened offices at 1010 House building, Pittsburgh.

SAMUEL MATHER and W. G. Mather returned to Cleveland, May 12, from an extended European trip.

C. C. FINN, of the Finn Metal Works, has been named president of the Manufacturers' Association, Seattle, Wash.

W. H. McALLISTER, of the Cincinnati Car Co., Cincinnati, has been appointed treasurer of the Cincinnati Traction Co., that city.

J. J. STONE has been elected president of the Iron Mountain Mining Co., Duluth, Minn. He succeeds William Brown, who resigned.

O. W. MASON, formerly sales manager of the Midland Steel Co., Pittsburgh, and who has been ill for some time, is at Atlantic City, N. J.

A. L. KASMEYER, who has been general auditor of the Cincinnati Traction Co., has been appointed auditor of the Cincinnati Car Co., Cincinnati.

JAMES N. WALLACE, president of the Central Trust Co., New York, has been elected a director of the Central Foundry Co., succeeding Nathan D. Bill.

JOHN R. BRIGGS, chief clerk of the Glasgow Iron Co., Pottstown, Pa., has taken charge of the Philadelphia offices of Henry Potts & Co., iron and steel brokers.

W. **CRASTS,** metallurgist, president of the Crucible Steel Forge Co., Cleveland, has left for an extended tour of Europe, during which time he will visit the leading electric steel plants.

W. U. PARSONS has been elected a director of the Lanson Monotype Co., succeeding his brother, Henry Parsons. T. C. Camp has been chosen to succeed J. S. Bryan.

RUSSELL K. BOADWEE, superintendent of the Thomas Iron Co.'s blast furnaces at Hokendauqua, Pa., has resigned to become general manager of the Crown silk mill at Bangor, Me.

WILLIAM GILBERT, president of the Buckeye Foundry Co., Cincinnati, has left with his family to spend the summer at the Thousand Islands. He will return to Cincinnati about next November.

L. B. LINDEMUTH has been promoted to the position of assistant superintendent of the open-hearth department at Steelton, Pa., of the Pennsylvania Steel Co. The appointment was effective May 1.

HUGO DICKE, civil engineer, is sending notices to the trade that he has opened an office at Berlin, Germany. He has been interested in water gas production as applied to the iron and steel industry.

C. H. WELLS was elected president of the Glens Falls Machine Works, Glens Falls, N. Y., at the recent annual meeting. Other officers are: Andrew Tromblee, vice president; E. A. Hill, secretary and treasurer.

J. W. NOTT, formerly with the David Williams Co., New York City, has succeeded R. G. Spencer as advertising manager of The Stanley Works, New Britain, Conn. Mr. Spencer has started on an extensive tour through the west in search of health.

WADDELL CATCHINGS, who has been chairman of the board of directors of the Platt Iron Works Co., Dayton, O., has been named president, succeeding J. B. Reichmann. The latter announced his resignation was due to his desire to spend all of his time in New York. He was formerly head of the Carnegie Trust Co., that city.

J. C. MANTERNACH, formerly sales manager of the Standard Welding Co., Cleveland, has been appointed general manager succeeding Tracy W. Guthrie, resigned. S. W. Hartley has been promoted from assistant sales manager to succeed Mr. Manternach. R. S. Bryant has been named consulting engineer and C. C. Gressle has been made superintendent.

CARMI THOMPSON, recently placed in charge of the Great Northern Iron Ore Properties with the title of manager, was born in Wayne county, W. Va., Sept. 4, 1870. He graduated from Ohio State University in 1892, with the degree of Bachelor of Philosophy. He was admitted to the bar of Ohio in 1895; was city solicitor of Ironton,

CARMI THOMPSON

O., 1896-1903; member of the Ohio legislature, 1903-07; speaker of the Ohio house, 1906-07; secretary of state of Ohio, 1907-11. After retiring as secretary of state, Mr. Thompson served short terms as assistant secretary of the interior of the United States, secretary to President Taft, and United States treasurer. He was a captain in the Spanish-American war.

ROBERT DUNNING has resigned as vice president of the Cincinnati Car Co., Cincinnati, and his place will be filled by Thomas Elliott, who is at present chief engineer of the Cincinnati Traction Co. Mr. Dunning will take a position with a manufacturing concern in the east. Mr. Elliott will continue in his present capacity with the traction company.

I. F. KREMER, of the engineering department of the J. W. Paxson Co., Philadelphia, has given several exhibitions in eastern Pennsylvania cities during the past two weeks of stereopticon views of that company's products. The exhibitions were held in Harrisburg, Carlisle, Chambersburg, Waynesboro, Columbia and York and were well attended by the foundrymen of those localities.

JOHN K. FRYE was elected president of the Pressed Steel Radiator Co., Pittsburgh, at the annual meeting of stockholders last week. Frederick C. Perkins was elected vice president; H. C. Shaw, treasurer; and A. M. Pearson, secretary and assistant treasurer. Directors chosen were: R. B. Mellen, A. W. Mellon, Frederick C. Perkins, John K. Frye, H. C. Shaw, H. A. Phillips and John W. Garland.

C. W. GOODYEAR was elected president of the Frontier Iron Co., 36 Letchworth street Buffalo, N. Y., at a reorganization meeting of the stockholders last week. A. D. Bissell is vice president and sales manager and Bradley Goodyear, secretary. A. D. Bissell has been associated with Rogers, Brown & Co., for a number of years. T. N. Ligh remains as superintendent, being the only official held over from the previous regime.

G. HANNAY, of the Oscar Barnett Foundry Co., was elected president of the Newark Foundrymen's Association, Newark, N. J., at its regular meeting last week. Other officers are: James Flockhart, of Maher & Flockhart, vice president; Arthur E. Barlow, of the Barlow Foundry Co., secretary; John Campbell, of Maher & Flockhart, treasurer; executive committee, James Flockhart, Louis Sacks, Thomas Malcolm, James Morrison and R. J. M. Welch.

J. W. MIDDENDORF, banker of Baltimore, is the president of the Alabama company, which has taken over the defunct Alabama Consolidated Coal & Iron Co., Birmingham, Ala. H. W. Coffin, who has been trustee in bankruptcy, was elected vice president and J. E. Whitney, secretary. W. Bartley Williams, who served as temporary president of the new company, is a director. Other directors are: J. W. Middendorf, W. C. Page, W. E. Seddon, Summerfield Baldwin, H. Jennings, J. Levering, Henry Shriver, H. F. Meserve and C. J. Jacobs. Members of the executive committee are: W. E. Seddon, W. C. Page, H. Jennings, J. Levering and H. F. Meserve.

CLARENCE S. FUNK, who has been general manager of the International Harvester Co., for the past six years, has been made president of the M. Rumely Co., Laporte, Ind., manufacturer of agricultural implements, succeeding A. J. Rumely, resigned. This change and others, which have been made among the officers and directors of the company, is the result of a reorganization brought about by banking interests. These interests have represented that difficulties have arisen through too elaborate extensions of the business, the extravagence of the present management and a too liberal granting of credits. An executive committee has been appointed consisting of President Funk, Jas. A. Patten, Elisha Walker of Wm. Salomon & Co., of New York, and John H. Guy. A. J. Rumely, former president, and E. A. Rumely, who has been general manager, remain as members of the board of directors. The reorganized board includes besides the Messrs. Rumely, President Funk, Paul D. Cravath, Herman Clifford, C. A. Lafever, C. P. Holton, Elisha Walker, John H. Guy and Max Horwitz.

NEW BUSINESS

The machinery market during the past week was featured by an increasing number of orders for machine tools in small lots, and by the action of the Pennsylvania railroad in making awards covering a part of the inquiries sent out some time ago, which aggregated nearly $500,000. The large number of plant extensions and new enterprises announced during the past few months are an index of the amount of active industrial building construction now progressing, and which, in most cases, will be accompanied or followed by inquiries for equipment. Several receivers' sales scheduled for this week, and the change in relative volumes of foreign and domestic business in the Cincinnati market, are interesting features at this time.

In New York, machinery houses have booked close to what is considered a normal aggregate of orders during the past week. Since tariff reform has been under way, more or less hesitancy on the part of buyers has been looked for, but in many instances good orders have turned up unexpectedly. Purchasing by the Pennsylvania railroad on the $500,000 aggregate of inquiries put out last month has begun, and it is the opinion of the trade that this will be followed by further action throughout the next two or three months, until all of its requirements are provided for. The Norfolk & Western list is still open. This, however, is expected to develop into actual business before the end of May. There are a number of inquiries out for electric cranes. For the current year, local representatives of builders are anticipating a normal total of orders. Power machinery sellers are well supplied with inquiries, and are looking forward to a good volume of orders for the balance of the year.

In Chicago, the machine tool market has changed but little from conditions noted a week ago. A fair number of inquiries are being received in the mail, but these are widely scattered and call usually for one or two tools. Sufficient business is being transacted to prevent the growth of a pessimistic attitude on the part of dealers, who expect better business as time goes on.

In Cleveland, more inquiries for machine tools appeared last week, but business generally continues quiet. The Central Ohio steam shovel interest, which sent out an inquiry for a large number of tools, some weeks ago, has placed the bulk of its requirements. The railroads have shown no inclination to buy in quantity, although orders for single-tool lots have been taken recently.

In Cincinnati, domestic business with the machine tool manufacturers is probably a little in excess of foreign, which is a condition that has not existed there for some time. With the exception of bakery machinery, orders received recently have been mainly for small lots or single tools. Orders for baking machinery, however, have been good, and local plants manufacturing this line will be busy for some time on orders already on hand. A few machine tool plants are fairly busy on automobile work, but as a general rule, business has been none too good. Second hand machinery is selling in small lots only, and there is not much of a market for this line, either in disposing of tools to dealers or to the trade.

In Philadelphia, the machinery market the past week has been quiet as far as important sales are concerned. Numerous orders were booked, but most of these were for one or two tools. Bids are now in on the machinery which has been inquired for by the Pennsylvania railroad during the past four or six weeks, and it is expected that awards will be made from time to time during the next few months. This machinery is for various shops on the Pennsylvania lines, both east and west of Pittsburgh, and its purchase will involve the expenditure of about $500,000. The inquiries were not put out in the form of one or more lists, but were made separately for each item. About 60 lathes of various sizes are included. In the second-hand machinery market, there has been considerable interest recently as a result of several receiver's sales. Most of the machinery of the Wetherill Finished Castings Co., Philadelphia, was purchased by the Monarch Machinery Co. Other bankrupt sales were scheduled as follows: The Louis J. Bergdoll Motor Co., May 14-15; Orianna Machine Shop, May 12; Root Dairy Supply Co., West Grove, Pa., May 12.

ALABAMA

ATTALLA.—The Peacock Iron Works, Attalla, is selling stock, but work is expected to be started on the plant within a few weeks.

BIRMINGHAM.—The Gadsden Pipe Co. has been incorporated to manufacture pipe; $35,000; by H. Hammond, William M. Byrd Jr., and Otto Agricola.

FORT PAYNE.—The stove foundry at Fort Payne, idle for several years, may be operated again. Plans are to make a co-operative shop of it.

MOBILE.—The Mobile Stove & Pulley Works will establish a plant at Mobile for the manufacture of crane mills.

RUSSELLVILLE.—The Sloss-Sheffield Steel & Iron Co., Birmingham, has awarded the contract to T. Worthington, of Birmingham, for the construction of three and one-half miles of railroad at Russellville, to connect the company's mines with the new iron ore washer which will be constructed at an early date. (Noted Feb. 13).

ARIZONA

PHOENIX.—The Salt River Valley Water Users' Association will receive bids until June 5 for the construction of the power plant building for the Crosscut Power Co.

PHOENIX.—The Layne & Bowler Corporation has been incorporated to manufacture and install machinery, etc.; $400,000; by Paul D. Bowler, S. M. Halstead, G. A. Johnston, et al., all of Los Angeles, Cal.

PHOENIX.—The Plowboy Tractor Co. has been incorporated to manufacture and deal in traction engines, tractors, farm machinery, etc.; $300,000; by E. F. Essig, Geo. H. Graham and A. E. Essex.

ARKANSAS

BOONEVILLE.—Greenway & Harvey is planning to install additional lighting equip-

ment in their power plant at Booneville.

TEXARKANA.—The Cotton Belt Railroad Co. is planning to improve and enlarge its round house and machine shop at Texarkana.

YELLVILLE.—Edward Zimmermann, Joplin, Mo., and associates have acquired the Maumee mines near here, and are planning to build a 200-ton mill.

CALIFORNIA

SAN FRANCISCO.—The Western Foundry Co. has been incorporated; $50,000; by J. E. Cope, John Hedley and P. Hedley, all of San Francisco.

COLORADO

FORT COLLINS. — The Greeley Hydro-Electric Co. is planning a large expenditure in irrigation and hydro-electric developments near here.

MEEKER.—The board of county commissioners has appropriated $5,000 for the construction of a new bridge to replace the one at White River City, which was washed away recently.

CONNECTICUT

BRIDGEPORT.—The Bridgeport Brass Co., Bridgeport, advises the addition to its tube mill now under construction is 50 x 360 feet.

BRIDGEPORT.—The New Britain Machine Co. is erecting a new building, 38 x 358 feet, five stories, to be used for increased tool room facilities, forge room and general manufacturing. No new equipment is needed. (Mentioned May 1.)

BRIDGEPORT.—The Hawthorne Mfg. Co., Inc., Bridgeport, advises that its new building is to be used for manufacturing motorcycle and automobile lamps, patented metal specialties, automobile accessories, furniture trimmings and a general line of hardware. The machine equipment will consist of punch presses for stamping, cut and draw presses, for shells, cut and carry presses for stamping trimmings, drop presses, buffing and polishing machines, nickel plating devices and other types of machines used in sheet metal working. Part of the equipment is in the present plant, but additional equipment will be necessary when the company moves.

HARTFORD.—The Hartford Contractors' Supply Co. has been incorporated to manufacture and deal in tools and appliances; $50,000; by K. B. Noble, I. B. Holley and A. C. Bill.

HARTFORD.—The Hartford Special Machinery Co. is about to build a plant at Hartford. The Noble & Westbrook Co. is building a plant at East Hartford and will move its stamp and die manufacturing from Hartford.

NEW HAVEN.—The New Haven Scrap Iron & Metal Co. has been incorporated; $10,000; by Wolf Alderman, Barnett Krvitsky and Meyer Rosoff.

WATERBURY.—The Manufacturers Foundry Co. has increased its capital stock from $100 000 to $200,000. Plans for new construction noted April 17.

DELAWARE

WILMINGTON.—The New Castle county levy court is considering the construction of a new bridge over the Narrow Dyke.

DISTRICT OF COLUMBIA

WASHINGTON.—Sealed proposals will be received at the Bureau of Yards and Docks, Navy Department, until June 7 for furnishing one switching locomotive for the navy yard, New York. Specifications can be obtained on application to the bureau or to commandant of the navy yard named.

WASHINGTON. — The following foreign trade opportunities are noted in the Daily Consular and Trade Reports. Inquiries in which addresses are omitted are on file at Bureau of Foreign and Domestic Commerce. In applying for addresses refer to file number:

No. 10873. Machinery and equipment for a light and power company.—An American consular officer in a European country has forwarded a pamphlet explanatory of an important industrial undertaking being organized in his district, which may offer favorable opportunities for the sale of certain classes of American goods. A company has been formed for the erection of coke ovens, installation of a coal sorting plant, an electrical station for supplying current to industrial establishments, and to conduct general commercial and industrial works. Copy of the pamphlet will be sent to interested firms by the Bureau of Foreign and Domestic Commerce.

No. 10875. Structural iron and building material.—An American consul in a Latin-American country reports that a leading architect of his district is desirous of receiving catalogues, price lists, and terms from structural iron and building material manufacturers. There is said to be a growing demand in the country in question for American building material which it would be well to cultivate.

No. 10891. Iron and steel railway supplies.—An American consular officer in a European country reports that local railways are in the market for iron and steel supplies, and correspondence in English regarding quantities and terms of delivery may be carried on with a person whose name is given in the report.

No. 10900. Machine tools.—An American consul reports that a local company engaged in the manufacture of projectiles and war material is in the market for machine tools to the extent of $260,000. It desires to buy direct from manufacturers and prefers American machine tools. Interested firms are requested to communicate with the consulate in question, and the correspondence will be transmitted to the firm making the inquiry.

No. 10902, Agricultural implements.—A business firm in a Mediterranean country informs an American consulate that it desires to be put in touch with American exporters of agricultrual implements in general.

FLORIDA

CHIPLEY.—The Chipley Light & Power Co. will receive bids until May 20 for the construction of an electric light system at Chipley. A. A. Myers, president. The Solomon-Norcross Co., 1622 Chandler building, Atlanta, Ga., engineer.

DUNNELLON.—A $50,000 bond issue, recently passed, will be used to construct an electric light plant and water-works system. H. M. Boswell, mayor.

JACKSONVILLE.—The Dixie Machinery & Mfg. Co., recently incorporated, has established its plant in the building formerly occupied by the Michigan Motor Car Co. and begun operations.

WATERTOWN.—The planing mill of the East Coast Lumber Co. was destroyed by fire recently.

GEORGIA

ABBEVILLE.—The town has voted an $8,000 bond issue for the construction of a municipal electric light plant.

CORDELE.—J. G. White & Co., 47 Exchange place, New York City, recently purchased the properties of the Citizens' Electric Light & Power Co., Cordele, and are considering plans for the expenditure of $25,000 in improvements.

NEWNAN.—The R. D. Cole Mfg. Co. recently secured contracts for two large steel towers and tanks, one to be erected at Aurora, Ind., and the other at Rising Sun, Ind.

QUITMAN.—Plans are being prepared for the improvement and extension of the municipal electric light plant here.

ROME.—The Hanks Foundry Co. has purchased a three-acre building site near here and will begin at once the erection of a foundry for casting stove parts.

TALLAPOOSA.—The properties of the Southern Car Wheel Iron Co. at Tallapoosa has been purchased by J. M. Garvin and associates, who are planning to undertake improvements.

VALDOSTA.—A contract for furnishing a Corliss cross-compound condensing pumping engine, of 3,000,000-gallon capacity, is reported to have been awarded to the Platt Iron Works, Dayton, O., for $8,241.

ZEBULON.—An issue of bonds for $10,000 has been voted for the construction of a municipal water-works system.

IDAHO

BOISE.—Owyhee Irrigation Power Co. has been incorporated for $10,000,000 to carry on irrigation and power business in southern Idaho.

LEWISTON.—The Lewiston-Clarkston Valley Railway Co. will build an extension of its lines to Lewiston Orchards at a cost of $120,000.

MOSCOW.—The city water-works system is being improved by the laying of new steel mains.

ILLINOIS

ALTON.—The Beall Tool Co. has been incorporated to manufacture tools; $300,000; by Charles L. Beall, J. Montgomery Malcolm and Henry S. Baker.

CHICAGO.—H. L. Stevens & Co., architectural engineers, have decreased their capital stock from $100,000 to $10,000.

CHICAGO. — A permit has been granted for the erection of a six-story brick warehouse to cost $400,000 for the Ford Motor Co. at 3901-3921 S. Wabash avenue.

CHICAGO.—The Tri Way Co. has been incorporated to do a general manufacturing business; $50,000; address in care of Warner Robinson, 38 South Dearborn street.

CHICAGO.—The La Salle Light Co. has been incorporated to manufacture and deal in electric supplies; $10,000; address in care of Karl C. Loehr, 138 North La Salle street.

CHICAGO.—A permit has been granted to the Illinois Malleable Iron Co., 2855 North Paulina street, for the erection of a one-story brick foundry to cost $20,000. H. H.

Richards, 327 South La Salle street, is the architect.

CHICAGO. — The business of Woldenberg & Schaar, dealers in scientific apparatus, instruments and laboratory supplies, has been incorporated; $50,000; by Maximillian Woldenberg, Bernard E. Schaar and Clarence E. Schaar. The firm is located at 1025 North State street.

CHICAGO.—A permit has been granted to the Monarch Motor Mfg. Co., 1407 Title & Trust building, for the erection of a one-story brick factory building at 4634 West Madison street. It will cost $16,000. J. Coleman, 7100 South Chicago avenue, is the architect.

GALESBURG.—The Galesburg Malleable Casting Co. is planning extensions to its plant.

GALESBURG.—The plant of the Robson Mfg. Co. was turned over recently to the Automatic Devices Co., a new corporation formed in Galesburg by Senator C. F. Hurburgh, E. M. Wharff and R. C. Wharff. The Automatic Devices Co. will begin at once the manufacture of a new automatic spring- operated engine starter for use on automobiles. In addition, the new company will continue the manufacture of the Robson Mfg. Co. emery wheel and grindstone dresses, hose clamp tools, automobile jacks, special tools, machinery, etc.

PEORIA.—The Keystone Wire & Steel Co. will resume operations in its machine shops soon.

PEORIA.—The Peoria, Canton & Galesburg Railroad Co. has been incorporated with principal office at Peoria to construct and operate a railway from Peoria to Galesburg, by way of Farmington; $2,000,000; by J. A. Lyon, Chicago, Horace Clark, W. R. Coleman, Geo. C. Powers and G. T. Page, all of Peoria.

PEORIA.—The Central Illinois Light Co., formerly the Peoria Gas & Electric Co., capitalized at $7,500,000, and reported to be in control of 19 electric plants outside of Peoria, advises that it is making extensive improvements to its generating plant at Peoria. The engine room is being rebuilt and equipment installed as follows: 25-ton electric crane; 25,000-kilowatt switchboard; 5,000-kilowatt turbine and condenesr; 10,000-square foot economizer and fan; miscellaneous machinery. Plans have been completed and all contracts awarded, and the work is now so far advanced that compeltion by the later part of the summer is expected.

SPRING VALLEY.—Given Moore, president of the Given Moore Co., manufacturer of farm machinery, advises that the company's new plant is in course of construction and will be ready for occupancy by the middle of July or first of August, and that it will be devoted to the manufacturing of farm machinery. Machinery now at the Columbus, Ind., plant is to be moved to the new plant and additional wood-working machinery, lathes, drills and milling machines will be needed.

STERLING.—The Rock River Light & Power Co. has been incorporated to operate a heat, light and power plant; $300,000; by H. H. Wood, Edwin F. Lawrence and H. S Greene.

URBANA.—Geo. M. Bennett, president of the Kankakee & Urbana Traction Co., advises that the line is at the present time in operation from Urbana to Rantoul, and that he has not yet contracted for the steel, etc., necessary for the proposed extension of the line.

WARSAW.—The local electric light plant has been purchased by the Stone & Webster Engineering Corporation, Boston, Mass. The new owner is reported to be planning the expenditure of $20,000 for improvements.

INDIANA

EVANSVILLE.—The boiler-room of the Ingle Coal Co. was burned recently with $15,000 loss, the machinery being so badly damaged that it cannot be repaired. Purchases will be made in the near future.

GOSHEN.—The Modern Specialties Co. has increased its capital stock from $50,000 to $100,000.

HAMMOND.—The Chicago & Indianapolis Railway Co. has increased its capital stock from $100,000 to $4,000,000 and will build a line from Frankfort to Hammond, with laterals in Illinois.

KOKOMO.—Stockholders of the Kokomo Steel & Wire Co. have voted to install an open-hearth mill at their plant. Bonds in the amount of $400,000 are to be issued to pay for the improvement.

LOGANSPORT.—The board of county commissioners is reported to have under consideration plans for constructing a new bridge over Wabash river, at Seventh street, to replace the structure washed out at Third street.

SOUTH BEND.—The Indiana Brass Foundry & Manufacturing Association has been incorporated to manufacture brass products; $10,000; by S. J. Smethers, T. Bednarowicz and F. A. Deahl.

WEST BADEN.—The West Baden Water, Light, Heat & Power Co. has been incorporated; $75,000; by H. Ballard, et al.

WEST LEBANON.—The West Lebanon Electric Light, Heat & Power Co. has been incorporated; $10,000; by William A. Hunter, Frank Berge, et al.

IOWA

CARSON. — Arrangements are being made for the construction of an electric light plant here to replace the one destroyed by fire recently.

DUBUQUE.—The Dubuque Boat & Boiler Works Co. will erect a new building at this point. Work on the foundation has been started. Electrical apparatus will be installed to do the greater part of the work.

FONTANELLE.—Bonds to the extent of $10,000 have been voted for the construction of a municipal electric light plant. H. G. Stuhlmiller, clerk.

MONONA.—A bond issue has been voted for the construction of a water-works system.

WATERLOO.—The Sycamore Heating Co. will erect a heating plant which will cost approximately $38,000. Plans have been completed by Clinton Shockley, architect, and will be submitted for bids in a short time.

KANSAS

HUTCHINSON.—Two steel silos, each 16 feet in diameter and 30 feet high, are being built on a farm near here.

WICHITA.—The Wichita Terminal Elevators Co. has been incorporated; $250,000; by C. L. Davidson, Paul Noble, C. H. Natton, Chas. Smyth, C. W. Southward, H. D. Grace, R. L. Holmes, L. W. Clapp and A. S. Parks.

KENTUCKY

ASHLAND.—The Ashland Steel Co. is reported to be planning the installation of additional machinery. Important improvements were recently completed.

ASHLAND.—An electric railway line will probably be constructed between Ashland and Russell. S. S. Willis, an atorney, has data regarding the proposition.

ELIZABETHTOWN.—The Kentucky Utilities Co., Lexington, Ky., is to install additional machinery in its plant here so as to be able to provide a 24-hour current.

ELIZABETHTOWN.—The municipality is to purchase a 300-gallon pump, operated with a 20-horsepower motor. The estimated cost of the equipment is $1,100.

GEORGETOWN.—The Crosthwait Lock & Mfg. Co. has been incorporated to manufacture locks and similar products; $35,000; by G. M. Taylor, Victor Howard and J. W. Osborne.

LOUISVILLE.—The Seelbach Hotel Co., which recently let contracts for power equipment for a new plant, is to let an important contract for the erection of an eight-story addition to the hotel. Steel construction will be used.

PROVIDENCE.—A water-works system is to be built in the near future, outside capital having been interested. Tyler Stone can give information regarding the matter.

WINCHESTER.—Ten electric motors for the operation of wood-working machinery will be needed by the B. F. McCormick Lumber Co., which has a large planing mill.

LOUISIANA

DONALDSONVILLE.—The Peoples Machine Works, formerly the Ascension Machine Works, and operated by Capt. Joseph Constantin, and since January 14 by Hartrampf & LeBlanc, has been leased by Clarence LeBlanc, who will operate the establishment.

MAINE

PORTLAND.—The Dallas Electric Co. has been incorporated to conduct a general lighting, heating, street railway business, etc.; $7,000,000; by William E. Tucker, Chelsea, Mass.; David W. Snow, Portland; John H. Pierce, Portland.

PORTLAND.—The American Furnace & Engineering Co. has been incorporated to manufacture, sell and deal in boilers, machinery, etc.; $600,000; by Geo. T. Spear, president, South Portland; H. T. Lane, Newton Center, Mass.; S. C. Perry, Portland.

WATERVILLE.—A. L. Leadbetter is to open a foundry on Front street.

MARYLAND

BALTIMORE.—The Western Maryland railway will erect a roundhouse, 32 x 36 feet, machine shop, 86 x 192 feet and a power house, 20 x 32 feet, at Constitution and Monument streets, Baltimore. H. L. Pratt, chief engineer, Hillen Station, Baltimore.

MASSACHUSETTS

BOSTON.—The American Nut Lock Co. has been incorporated; $150,000; by J. A. Crane and James Conroy.

BOSTON.—The New England Machinery Co. has been incorporated; $50,000; by Montgomery Reed, Irving F. Gould and H. E. Thompson.

FALL RIVER.—The Fall River Electric

Co. is planning the expenditure of $200,000 for extensions and equipment for its plant. A. H. Kimball, general manager and purchasing agent.

NEWBURYPORT.—The Albert Russell & Sons Co. has added an addition to its foundry, 35 x 65 feet.

SPRINGFIELD—Clarence N. Bacon, treasurer of the Bacon & Donnovan Engine Co., who recently bought the stock owned by William J. Donnovan, president, has sold a large interest in the company to Marlin D. Farnum, and the firm name has been changed to the Bacon-Farnum Co. The company manufactures agricultural implements, engines, water-works system and lighting plants. Heavy mill machinery is to be added.

FITCHBURG.—The Fitchburg Machine Works has purchased the Becker shop on Water street and will use it as an assembling shop.

MICHIGAN

BATTLE CREEK.—The M. Rumely Co., La Porte, Ind., has completed the construction of two buildings at the Battle Creek plant. The buildings are a boiler shop, 120 x 340 feet and a wheel factory, 100 x 320 feet.

BENTON HARBOR.—Inducements have been offered the Kellerman Foundry Co., Chicago, to locate in this city.

CHELSEA.—M. J. Dunkel and C. Lehman will equip the second floor of the Mack building with machinery for the manufacture of automatic screw products. Six machines are to be installed at once. A machine shop is to be added.

DETROIT.—The W. H. Van Deuser Sales Co., manufacturers' agent for automobile specialties, has made arrangements with an Indiana inventor for the entire selling privileges of a new auto jack. The jack has been named "The Detroit." It can be used either under the axles or hubs, and it is claimed the set of four can be placed in position in less than a minute.

GRAND RAPIDS.—A contract for a new grand stand at Comstock park has been awarded to John McNabb Co. at $22,350. It is to be constructed of reinforced concrete and steel.

KALAMAZOO.—The Gerline-Myers Brass Foundry Co., recently incorporated, advises it is erecting a brick and steel building, 60 x 100 feet, and sheds 20 x 60 feet for sand, flasks, etc. The capital, $20,000, is all paid in. Samuel Franklin, proprietor of the Three Rivers Iron & Metal Co., Three Rivers, Mich., is president; Otto Gerline, for 13 years superintendent for the Three Rivers Brass Works, is vice president and manager, and Samuel B. Myers, foreman for the Henderson-Ames Co.'s brass foundry at Kalamazoo, is secretary and treasurer. General jobbing in high grade brass, bronze and aluminum castings will be done. The concern is in the market for equipment and supplies. O. H. Gerline, vice president, should be addressed at Three Rivers.

LANSING.—The American Weatherstrip Co. has been incorporated; $18,000; by A. G. Dickinson, M. S. Dickinson and A. E. Gould.

MARQUETTE.—The Duluth, South Shore & Atlantic Railway Co. contemplates the erection of a 15-stall roundhouse, including a 75-foot turntable, at this point. This project may mature sometime this year.

NILES.—The Kawneer Mfg. Co., manufacturer of metal architectural specialties, has increased its capital stock from $500,000 to $1,200,000.

SAGINAW.—General Manager Nash, of the General Motors Co., states that plans are being worked out for the revival of the former Marquette Motor Works plant in this city, which has been idle for some time.

SOUTH PARK.—The Romeo Foundry Co. has started work on additions which will double the capacity of its plant.

UNION CITY.—Work is being rushed on the improvement of the plant of the Peerless Portland Cement Co., and operations will be resumed as early as possible.

MINNESOTA

ALBERT LEA.—It is reported that the Minneapolis & St. Louis is planning to begin work June 1 on a new station, freight depot, office, and yards at this point. The total expenditure will be in the neighborhood of $300,000.

DULUTH.—The Wales-Campbell Co. has been incorporated to do a general engineering and construction business; $50,000; by C. R. Wales, Duluth; J. A. Campbell, Superior, Wis., and W. D. Shaw, Minneapolis, Minn.

GREY EAGLE.—Plans are being prepared to call an election on issuing bonds for the construction of a water works system at Grey Eagle.

MAPLE LAKE.—The Oscar Claussen Engineering Co., St. Paul, is preparing plans for the construction of a municipal water-works system at this place.

MINNEAPOLIS.—M. J. Goldberg & Co., St. Paul, metal refiners, have purchased a building site at Tenth and Washington avenues, upon which it expects to erect a plant and install the machinery now being operated in the present plant in St. Paul.

MINNEAPOLIS.—The Progressive Shoe Machinery Co. advises that a new plant it is building will be used for the manufacture of shoe machinery. The company will buy a new lathe, milling machines and a complete foundry equipment. An order has been placed for the foundry equipment but the company still is in the market for the factory machinery.

MINNEAPOLIS. — The Minneapolis, St. Paul & Saulte Ste. Marie is building extensive shops in this city at a reported expenditure of $350,000. The building will include a three-story addition to the blacksmith shop, an addition to the roundhouse, a wood-working shop, flue shop, battery and tool house and boiler shop. C. N. Kalk, 317 Twentieth avenue, Minneapolis, is chief engineer and S. W. McKenyon, 522 Metropolitan building, is architect.

MINNEAPOLIS.—A. B. Harris, general manager of the Shotwell-Harris Co., advises his company is a combination of six smaller companies, manufacturing hardware specialties, patented metal specialties, automobile specialties, tools, dies, models and special machinery and small copper products. The company in acquiring larger quarters will be able to take on more work and in a short time will be in the market for lathes, milling machines, punch presses, complete air system and special machines for making automobile specialties.

MOORHEAD.—The Moorhead Furnace Co., manufacturer of furnaces, formerly located at Fergus Falls, is now operating a foundry at Moorhead.

MISSOURI

CARL JUNCTION.—Jackson & Co. contemplate the installation of a mill in connection with the development of 40 acres of mining land near here.

KANSAS CITY. — Worley & Black, consulting engineers, Reliance building, are preparing plans and specifications for an electric light plant at Garden City, Kan., the cost to be $40,000, and an electric light plant at Augusta, Kan., to cost $18,000.

ST LOUIS.—The Landes Machine Co. is planning to build an addition to its plant, at a cost of $8,000.

ST. LOUIS.—The Ruemmeli-Dawley Mfg. Co., manufacturer of ice making and refrigerating machinery, advises that it has added improvements, to its plant during the past winter, which includes an addition to the boiler and plate construction department and the installation of punching machines and a plate planer.

MONTANA

BILLINGS.—Bids will be received until June 24 for the purchase of $575,000 in bonds, which are being issued for the construction of a water-works system. C. E. Durland, city engineer.

GREAT FALLS.—The Deere & Webber Co., dealers in farm implements and machinery, has established a Montana sales branch at Great Falls.

NEBRASKA

CLAY CENTER.—Bids will be received until May 20 for the erection of a 70-foot bridge with a 20-foot roadway. W. K. Newcomb, county clerk.

RALSTON.—The board of trustees will receive bids until June 3 for constructing a water-works system, requiring cast iron mains, 50 feet 8-inch pipe; 9,800 feet 6-inch pipe; 21,500 feet 4-inch pipe; one 8-inch valve; 10 6-inch valves; 13 5-inch valves, etc.

STEINAUER.—A bond issue of $7,000 has been voted for the construction of a municipal electric light plant.

NEW HAMPSHIRE

LACONIA.—The Laconia Car Co. is contemplating engaging in the construction of steel cars on a large scale, which will require an enlargement of the company's plant. Henry B. Tilton, superintendent.

NEW JERSEY

MOORESTOWN.—The town council has been advised by its consulting engineer, Alexander Potter, 50 Church street, New York, N. Y., to purchase the present water system which is owned by private interests and improve the property by the expenditure of about $50,000. The plant can be secured for approximately $80,000. It is thought that definite action will be taken very shortly by the council.

NEWARK.—The Merchants' Refrigerating Co. has filed plans for a large building to be erected at 49-51 River street. The building will be seven stories, of reinforced concrete, and it is estimated to cost $51,500.

NEWARK.—The Passaic Valley Sewage Commissioners will receive bids until July 1 for furnishing and erecting a pumping plant for the Newark Bay Pumping Station, Newark. W. M. Brown, engineer; J. S. Gibson, clerk.

TRENTON.—The Newton A. K. Bugbee Co. has been awarded the contract for the

iron work in connection with the four-story addition to the plant of the Mott Iron Co. at Trenton, which is estimated to cost, complete, about $150,000.

NEW YORK

ALBANY.—The New York Central Railroad Co. has been authorized to proceed with the construction of a bridge over the Hudson river a few miles below Albany. The authorization provides that the bridge shall have a clearance of not less than 135 feet above mean low water. The bridge is to be built under the name of the Hudson River Connecting Railroad Corporation, and its purpose is the connection of the New York Central, West Shore and Boston & Albany railroads.

BROOKLYN.—The Department of Education, Park avenue and Fifty-ninth street, Manhattan, has awarded the contract for installing heating and ventilating apparatus in the new school building to be erected in Brooklyn. R. J. McKinnon, 217 West 125th street, Manhattan, received the award at $38,000.

BUFFALO.—The Otis Elevator Co. recently secured a permit to build a foundry of brick construction at 135 Sheridan street, to cost $140,000.

BUFFALO—Construction has been started on the addition to the works of the Atlas Steel Castings Co., 1936 Elmwood avenue, Buffalo, mention of which has been made previously. The foundry capacity is to be doubled.

NEW YORK CITY.—The Turner Construction Co., 11 Broadway, has been awarded the contract to construct four reinforced concrete manufacturing buildings by the Cyphers Incubator Co., of Buffalo.

NEW YORK CITY.—H. K. Corbin, 170 Broadway, has been awarded a contract to furnish and lay 29,100 feet of 24-inch cast iron water main for the Consolidated Water Co., Utica, N. Y.

NEW YORK CITY.—Marman Fougner, 25 Madison Square, North, engineer in charge of the Neptune Meter Co.'s new building, Long Island City, L. I., advises that the building will be five stories high, 72 x 173 feet. The engineering department of the company prepared the architectural plans.

NEW YORK CITY.—Ross & McNeill, architects, 39 East Forty-second street, are receiving bids for the construction of a six-story factory building for the Automatic Pneumatic Action Co., Fifth street and Twelfth avenue. It will occupy a site 75 x 95 feet, and is estimated to cost $40,000.

NEW YORK CITY.—The following bids were received by the board of water supply of New York City, April 29, for supplying racks, stop shutters, screws, lifters and other gate chamber apparatus for installation along the Catskill aqueduct, included in contract No. 91: Vulcan Rail & Construction Co., 35 Meserole avenue, Brooklyn, N. Y., $34,675; Joseph Baloban Co., 156 Fifth avenue, New York, $40,250; Howard H. Peterson Co., Inc., $42,195; Bartolicius Star Iron Works, Inc., Park avenue, New York, $51,131, and the Exeter Machine Works, Pittston, Pa., $71,908.

ROCHESTER.—The Rochester Bronze & Aluminum Co., Inc., has been incorporated to manufacture brass, bronze, iron and aluminum castings, etc.; $25,000; by P. F. Lemke, 20 Athens street, and Joseph Strauss and John J. Keefe, both of 18 Sterling street, all of Rochester.

SYRACUSE.—The Redden Iron Works, Marcellus street, is having plans prepared by E. A. Howard, architect, for an extension to its foundry, 28 x 75 feet.

NORTH CAROLINA

FORT CASWELL.—James R. Campbell, constructing quartermaster, will receive bids until May 26 for furnishing the material, labor, machinery, etc., necessary to install a complete drilling and preliminary water-softening plant, with the necessary boilers, tanks, piping and accessories needed to furnish not less than 3,000 gallons per hour or 70,000 gallons daily.

MURPHY.—The city has voted a $70,000 bond issue for building and equipping an electric light plant. D. W. Deweese, mayor.

WINSTON-SALEM.—The Southern Power Co., with main offices at Charlotte, will expend $50,000 on improvements to the electric light plant and street railway system.

NORTH DAKOTA

GRAND FALLS.—The board of county commissioners have been petitioned to investigate the need of constructing several bridges throughout the county.

MAYVILLE.—Plans are being prepared by the Oscar Claussen Engineering Co., St. Paul, Minn., for the construction of a municipal electric light plant at Mayville.

OHIO

AKRON.—Bids for furnishing either a vertical triple-expansion pumping engine of 15,000,000 gallons per 24 hours capacity, or two turbine-driven centrifugal pumping units, each of a capacity of 15,000,000 gallons per 24 hours, will be received until May 23 by R. M. Pillmore, director of public service, Akron.

BOLIVAR.—The Bolivar Light & Power Co. has been incorporated; light, heat and power; $10,000; by H. L. Lash, J. O. Lash, J. C. Becker, G. E. Bowen and W. B. Ramsey.

CINCINNATI. — A permit has been granted to the Ohio Knife Co., of Cincinnati, to erect a reinforced concrete factory building at Breman street and the C., H. & D. railroad, that city. The building will cost about $30,000.

CINCINNATI.—The Warner Elevator Co., Cincinnati, will build a two-story administration building to its plant on Spring Grove avenue, 60 x 60 feet. Estimates are now being received for this work at the offices of the company.

CINCINNATI. — The Buckeye Products Co., manufacturer of foundry supplies and specialties, advises that it has taken a long time lease on the premises of 919-921 West Fifth street, Cincinnati, and will install new equipment for the manufacture of its products.

CINCINNATI.—The roofing and sheet metal work that will be used in the construction of the new building of the Lippincott Co., which is being built on lower Main street, Cincinnati, has been let to the Jacob Freund Roofing Co., of that city. The building is in charge of the engineering firm of Stegner, Hughes & Alves, Cincinnati.

CINCINNATI.—The American Tank, Pump & Oil Co., with principal offices in Cincinnati, is to be re-incorporated as the American Tank & Pump Co. with a capital of $50,000. The plant is located at Dayton, O., and the company has branch offices throughout the country. The plant was recently sold to A. C. Davis, of Cincinnati. Tanks, seal measuring, and pumps for oil, gasoline and other liquids will be manufactured.

CINCINNATI.—A new brass foundry, to cost about $40,000, will be built at the northeast corner of Plum and McFarland streets, Cincinnati, by Thomas J. Nichol & Co., of that city. The realty has been purchased for $30,000, being a lot 84 x 112 feet, making the total cost of the enterprise $70,000. The company is at present located at Pearl and Ludlow streets, Cincinnati, and manufactures steam heating appliances.

CINCINNATI.—The Crescent Tool Co., 115 West Second street, has completed all preliminary arrangements for the building of a new shop on Reading road, that city, to be of steel and brick construction and which will contain about 2,500 square feet of floor space. This move has been necessary because of increasing business which makes the present quarters of the company too small. The company will also be in the market for an 8 or 10-horsepower gasoline engine and probably some small machine tools.

CINCINNATI.—The Allen Breed Tractor Co., which recently purchased the plant of the Fireproof Construction Co. at Carthage Pike and the Big Four Railroad, St. Bernard, Cincinnati, has taken out articles of incorporation with a capital stock of $50,000. The incorporators are Allen Breed, Louis J. Dolle, N. W. Reedy, Walter C. Taylor and E. P. Lamping. The company will begin about August 1 in the manufacture of oil-burning traction engines, such as are used on farms for pulling gang plows, road contracting work, etc. The president and general manager of the company will be Allen Breed. Offices have been established at 503 Mercantile Library building, Cincinnati. The equipment, power plant and machine tools have all been purchased.

CLEVELAND.—J. F. James, president of the Standard Steel Castings Co., West Seventy-third street and the Big Four tracks, advises that the company has started operating its foundry and pattern shop and is in shape to take care of any amount of business.

CLEVELAND.—The Grant-Lees Machine Co., manufacturer of transmission, timing, bevel and worm gears and differentials, which recently changed its name to the Grant-Lees Gear Co., is doubling its capacity by an addition to its plant on East Seventy-ninth street.

CLEVELAND.—The Price Electric Co., manufacturer of pyrometers, is constructing a new building, 48 x 85 feet, two stories, which will be equipped with new machinery and laboratory apparatus. The new plant is expected to be ready for occupancy in July or August.

CLEVELAND.—Sealed proposals will be received at the office of the director of public service, No. 104 City Hall, until May 21 for furnishing two steel side-dump railroad cars for the Cleveland garbage disposal plant. W. J. Springborn, director and W. H. Kirby, secretary.

CLEVELAND.—The Van Dorn Electrical Tool Co., recently incorporated with a capital stock of $300,000, to manufacture portable electrically-driven drills and reamers, will take over this line of work formerly done as a side line by the Van Dorn & Dutton Co. The two companies, although closely allied, will be under separate management.

KENTON.—The Champion Iron Co., of this city, has secured the contract for the structural steel work in the New Hardin county court house. The general contract was awarded to the Steininger-Taylor Construction Co., of St. Louis.

LIMA.—The Cincinnati, Hamilton & Day-

ton Railroad Co. is planning changes and improvements to its shops at Lima.

MANSFIELD.—The board of commissioners of Richland county has been authorized to take steps looking toward the destruction of seven bridges in that county which were damaged by the floods, to make way for new bridges.

MASSILLON. — The Russell Engine Co. has decreased its capital stock from $250,000 to $2,500.

MT. VERNON. — The Pittsburgh Plate Glass Co. is planning to double the capacity of its plant at Mt. Vernon. H. G. Slingluff, plant manager, has stated that three new buildings will be constructed and 12 new machines will be installed. A machine shop will be constructed and another tank built.

RAVENNA.—The Browning Foundry Co. suffered a loss recently by fire at its plant.

ST. MARYS.—The St. Marys Machine Co. has increased its capital stock from $15,000 to $250,000.

TOLEDO.—The France Stone Co. has increased its capital stock from $40,000 to $500,000. President France is not yet ready to announce the plans for improvement.

TOLEDO.—The Arrow Mfg. Co. has been incorporated to manufacture and deal in electrical apparatus, special machinery and parts, etc.; $10,000; by H. Haudenschild, W. V. McLin, L. A. Rowley, Scott Rowley and W. C. Cornell.

TOLEDO.—R. Winthrop Pratt, of Cleveland, has been employed as consulting engineer to work out the problem of disposing of sewage in Ten Mile Creek and Swan Creek, which, it has long been contended, are a menace to the city's health. Mr. Pratt will be employed for three months and will receive $250 a month and expenses. A report must be submitted to the state board of health not later than June.

TOLEDO.—The Duncan Forge Co. has recently taken over the Vulcan Iron Works, the Bellefountaine Steam Shovel & Dredge Co., the Globe Boiler Works and the Gibsonville Tool & Machine Co. All these plants are now owned solely by the Vulcan Forge Co., and have been moved to Toledo. The principal product of the company is forging, by hand, steam and drop hammers. Hammers range from 100 pounds falling weight to six tons. The concern also manufactures steam shovels and dredges, does all kinds of forging for diemakers and is equipped for all kinds of machine work. The concern is equipped for doing work on board ships without taking the job to its plant and is now at work on the forging parts for 18 locomotives and two dredges.

WILLIAMSPORT.—The county commissioners have decided to erect three steel bridges, one over the Scioto river west of South Bloomfield, another over the Scioto northwest of Circleville, and the third just east of Darbyville. Engineers will have the plans and specifications ready some time this month.

OKLAHOMA

MARIETTA. — The Benham Engineering Co., 435-37 American National Bank building, Oklahoma City, has been retained to draw up plans and specifications for proposed extensions to the water-works and electric light systems at this place.

WATONGA.—The Benham Engineering Co., 435 American National Bank building, Oklahoma City, has been retained to prepare plans and specifications for the extension of the electric light system at Watonga.

OREGON

AMITY.—People will vote soon on $15,000 bond issue for municipal water works system, to include pumping plant, 300,000-gallon reservoir and steel pipe down Trade street, 6 and 8-inch.

ARLINGTON.—People have voted $5,000 in bonds for municipal water-works. Plans drawn by Louis C. Kelsey, Journal building, Portland.

ASTORIA.—The Port of Astoria commission has passed an ordinance calling for a vote on an $800,000 bond issue to build municipal docks.

HOOD RIVER.—The Pacific Power & Light Co. will build a steel bridge across Hood river at a cost of $18,000, to carry pipe line.

PENDLETON.—A municipal gravity water system will be built at a cost of $200,000. Bonds will be sold May 14. Work calls for 16½ miles of pipe from 18 to 24-inch and two concrete reservoirs of 1,000,000 gallons capacity. Frank C. Kelsey, Journal building, Portland, engineer in charge.

PORTLAND.—The Beaver Portland Cement Co. has been incorporated for $60,000 with Robert T. Platt, Harrison T. Platt and A. B. Watzek as the principal stockholders.

PORTLAND.—The Coast Bridge Co. has secured the contract for erecting a bridge near Rosburg. The bridge will consist of three 126-foot spans of steel construction. The contract price is $19,736.

SALEM.—The Pendleton Mfg. Co., recently incorporated at $250,000 to engage in manufacturing business, will probably engage in the manufacture of farm implements and machinery.

TURNER.—Bonds for a municipal waterworks system have passed at the recent election, and plans are now being prepared by the engineers. The cost is estimated at $10,000.

PENNSYLVANIA

BEAVER FALLS.—The Pettler Steel Mat & Mfg. Co., which recently purchased the plant equipment of the defunct Glenn Mfg. Co., Ellwood City, will move this equipment to Beaver Falls, to be installed at its plant here. This will probably require the addition of a new building to the company's plant.

CHESTER.—The Chester Gray Iron & Brass Foundry Co., Fifth and Ward streets, which was organized about two years ago and which equipped its plant as a gray iron foundry, dismantling it later, has now re-equipped it as a brass foundry. It will make all kinds of brass, bronze and white metal castings. R. M. W. Ridington is owner of the plant.

CONWAY—The local shops of the Pennsylvania Lines West are being extended by the Riter-Conley Mfg. Co., Pittsburgh. About 300 tons of steel are involved.

FRANKLIN.—The Franklin Mfg. Co. advises that it is installing new machinery in its plant at Franklin, to provide an increased capacity for the manufacture of magnesia pipe covering, and that these improvements will be completed not later than July 1.

FRANKLIN.—The Franklin Steel Works, whose plant, with the exception of an 18-inch mill and the steel pole department, was almost totally destroyed by fire recently, entailing a loss of $200,000, covered by insurance, advises that it is planning to rebuild the plant immediately, on a larger scale, and equipped to provide all modern facilities. That portion of the plant not seriously damaged by the fire will be in operation again within a week or two.

HAMBURG.—The Hamburg Boiler Works advises that it is adding an additional warehouse to its plant and recently installed another lathe in its machine shop.

HARRISBURG—The Pennsylvania Steel Co. has let a contract to H. C. Wright for a general office building at Swatara and Front streets, Harrisburg.

MANHEIM.—The Bondy Foundry & Machine Co., manufacturer of power transmission machinery, advises that it is preparing plans for an addition to its plant, 50 x 128 feet.

MEADVILLE.—The Bronze Metal Co. has awarded the contract for the construction of a new building, 120 x 230 feet, of reinforced concrete and steel construction.

MORGANZA.—The board of managers of the Pennsylvania Training School will receive bids on May 20 for construction of a waterworks dam, according to plans prepared some time ago by R. Winthrop Pratt, consulting engineer, Cleveland. W. F. Penn, of Morganza, is superintendent.

PETROLEUM.—The new plant of the Pressed Steel Products Co. will begin operating May 15. It will make drawn, stamped and spun metal specialties, steel bilged barrels, sanitary barrels and steel barrels for general purposes.

PHILADELPHIA.—The Midvale Steel Co. is having an oxy-hydrogen plant installed by the International Oxygen Co., Newark, N. J.

PHILADELPHIA.—The General Engineering Co. has prepared plans for a new building at Front and Kenilworth streets, to be 70 x 150 feet. Approximate cost, $15,000.

PHILADELPHIA.—The Leeds & Northrup Co., manufacturer of electrical measuring instruments, advises that it has constructed and equipped a new shop in connection with its plant.

PHILADELPHIA.—The Fisher Leather Belting Co., manufacturer of leather belting, has moved from 408 Vine street to 221 North Third street, doubling the capacity of its plant.

PHILADELPHIA.—R. H. Seidel, Inc., advises that it has completed an addition to its plant, consisting of a two-story building providing about 1,000 square feet additional floor space.

PHILADELPHIA.—The Weder Mfg. Co., manufacturer of instruments and specialties, is preparing to erect a new plant. When the new building is completed the company will abandon its present location at Germantown and Stenton avenue. Charles Wolff, of the Weder Co., has charge of the plans.

PHILADELPHIA.—The George M. Newhall Co., Philadelphia, recently sold to the Baltimore & Ohio railroad an equipment which is practically the complete finishing end of a rail mill mounted on a railroad car. This equipment was made by the Industrial Works, Bay City, Mich.

PHILADELPHIA.—Ballinger & Perrot, architects, have awarded the contract for erecting a factory building for A. Edwin Newton, 1029 Oxford street. The building, when completed, will be occupied by the Walker Electrical Co. The contracts for the heating, electrical and sprinkling systems have not yet been awarded. A sand blast machine will also be purchased.

PHILADELPHIA.—The J. E. Lonergan Co., 211-215 Race street, advises that it is building an addition to one of its buildings, has installed a double stage air compressor

capable of 350 pounds working pressure, for testing purposes, a Cleveland automatic screw machine, five Fox lathes and a sprue cutter. The company states that 1912 was the best year in its history of forty years business, and that the first four months of this year show an increase of 42 per cent over the business conducted during a similar period in 1912.

PITTSBURGH.—The Jones & Laughlin Steel Co., Pittsburgh, has bought the old Keystone Rolling Mill property in Pittsburgh for $296,000. One tract has five acres and the other has a frontage of 407 feet on the Monongahela river.

PITTSBURGH.—The Riter-Conley Mfg. Co. is now fabricating three oil tanks to be erected for the United States government at Pearl Harbor, Hawaii. The company soon will commence work on 29 dam gates to be fabricated and erected for the Kuhn interests at the Cheat river power station.

READING.—The Carpenter Steel Works is constructing a new open-hearth steel furnace.

ROCHESTER—The Olive Stove Works is installing a new power system consisting of individual motors for all the equipment.

ST. MARYS.—The Elk Fire Brick Co., manufacturer of fire brick and clay, advises that it has been constructing kilns and driers for the past 12 months, and still has a large force of men working on further additions. The company now has two large plants and is preparing plans for another one, which will probably be built this year. The company advises that its plants are running full capacity and that it has orders on its books for a long time ahead.

WARREN.—The Barnhart-Davis Co. will increase the capacity of its plant by extensions, contracts for the construction of which have already been awarded.

WASHINGTON.—The commissioners of Fayette and Washington counties will probably be ready about June 1 to receive estimates on the construction of the proposed steel bridge over the Monongahela river.

WATSONTOWN.—The Jones Iron Foundry advises that it is building a 25-foot addition to its foundry, adding a new core department, and considering the installation of a larger cupola and sand blast machine.

SOUTH DAKOTA

RAPID CITY.—The Otho Development Co., owner of 1,000 acres of property near Keystone, which has been developed to a producing point, will install $75,000 worth of machinery during the summer for the manufacture of gypsum products. This will consist of an amalgamating and concentrating mill to be built in three units, the first of which will have a capacity of 100 tons daily.

TENNESSEE

HENDERSON.—The city council has voted in favor of a $50,000 bond issue for the erection of a new waterworks and electric light plant at this place.

NASHVILLE.—The Nashville Machine Co. probably will be awarded the contract for installing a 1,500-kilowatt and a 900-kilowatt turbine, its bids aggregating $45,000, being the lowest recently submitted.

TEXAS

ARLINGTON.—The Arlington Light & Power Co. has been incorporated; $200,000; by R. G. Carrell, W. M. Short and S. B. Cantey.

BEAUMONT.—The county highway commissioners have been petitioned to order a $30,000 bond issue election for building a bridge across the Neches river, connecting Beaumont with Orange county.

BELTON.—The City Electric Co., a consolidation of the Belton Light & Power Co. and the Belton Ice & Electric Co., has been incorporated; $60,000; by John D. Robinson, A. J. Denny, W. W. Thornton, Thos. Fairweather and M. V. Smith.

BROWNSVILLE.—The Brownsville municipal water and light plant is contemplating extensive repairs and the installation of additional machinery to the plant soon.

CORPUS CHRISTI.—The city council is planning to build a concrete reservoir of 155,000 gallons capacity, which will involve the installation of a relay pumping station five miles west of this city. Estimated cost, $25,000. H. A. Stevens, city engineer.

DALLAS.—The Southern Traction Co. is having plans prepared for a machine shop at Dallas. J. F. Strickland, president.

EDNA.—The Edna Electric Light, Ice & Water Co. has been incorporated; $20,000; by L. E. Ward, Rudolph Linnartz and W. W. McCreary.

FLORESVILLE.—H. B. Harman and O. A. Sims, of Beeville, have been granted a franchise by the city council to install an electric light plant at Floresville.

FORT WORTH.—The St. Louis Southwestern will begin work on extensive freight terminals within the next 60 days which will include a warehouse and a bridge over the Trinity river.

HOUSTON.—The Petroleum Iron Works, Houston, has sold two tracts of land to the Southern Transportation Co.

ORANGE.—The Hicks Gas Engine Mfg. Co. is preparing plans for the construction of a plant at Orange.

UTAH

LOGAN.—Approximately $100,000 will be expended for improvements and extensions to the water works system. T. H. Humphreys, city engineer.

PAYSON.—A bond issue of $43,000 was recently voted for the construction of a waterworks system.

VIRGINIA

BRIDGEWATER.—The Bridgewater Superior Plow Co. is planning to build a plant at Bridgewater, which will include a building 30 x 125 feet, two stories, with a wing 25 x 30 feet.

CHARLOTTESVILLE.—The Charlottesville & Albemarle Railway Co. has plans for the construction of a steam power plant, of 2,000 horsepower capacity, on Moore's Creek.

WINCHESTER.—The Winchester & Washington Street Railway Co.. has changed its name to the Northern Virginia Power Co. and increased its capital stock from $300,000 to $600,000.

WASHINGTON

ANACORTES.—The Anacortes Light & Water Co. has been incorporated for $300,000 to supply light and water for this city. Construction work will begin soon. Supplies will be purchased shortly, according to G. M. Bliven, one of the incorporators.

ARLINGTON.—Plans for extensive sewer work are being prepared by J. W. Morris, engineer in Yeon building, Portland, Ore. Bids will be called for soon.

BELLINGHAM.—H. J. Miller, of Everett, will build a $20,000 sawmill near here.

EATONVILLE.—The city council has commissioned the Evans-Dickson Co., 725 Commerce street, Tacoma, to pick a power site and prepare plans for a hydro-electric power plant on Marshall river to develop 150 horsepower.

ELWHA.—The board of county commissioners has ordered the erection of a steel bridge at Elwha crossing at an approximate cost of $22,000. Structure will be of steel, two spans, 210 feet long.

LEAVENWORTH.—The Washington Steel & Iron Co. is rushing the construction of its plant here and expects to be operating within a few months.

LEAVENWORTH. — The Great Northern Railway Co. is reported to be planning the construction of a machine shop at Leavenworth.

NORTH YAKIMA.—Charles Peterson, F. H. Sweet and John C. Sawbridge have filed articles of incorporation of a company to manufacture a pipe-covering device.

OLYMPIA.—Capital commission has authorized the sale of $4,000,000 in bonds to complete the capitol buildings. Bonds were authorized at last session of legislature.

PUYALLUP.—The people will vote on a $100,000 bond issue soon, money to be utilized to replace wooden pipe line from Salmon springs, headworks to the city with 18-inch cast iron main. Newspapers report public sentiment favorable to the issue.

SEATTLE—The Belugia Products Co. has been organized to manufacture oil and fertilizer in Alaska. A plant to cost $500,000 will be built. H. E. Elliott, vice president of Alaska Fish Products Co., Seattle, is manager of the company.

SPOKANE. — The Spokane, Portland & Seattle Railway Co. is preparing to build shops at Overlook, near Spokane.

TACOMA.—The Puget Sound Iron & Steel Co. is building an addition to their foundry and will require 50 experienced machinists when work is finished.

TACOMA.—The Weyerhaeuser Timber Co. will erect a large sawmill in Snohomish valley. George S. Long, Tacoma building, manager.

TACOMA.—The Chicago, Milwaukee & St. Paul Railway Co. has nearly completed the improvements being made to its shops at Tacoma. The capacity of the shops will be about doubled.

TACOMA.—Manager L. H. Bean, of the Tacoma Railway & Power Co., has informed city council that company will spend $315,000 in track and rolling stock improvements this sumer. The company is managed by Stone & Webster, of Boston.

TACOMA.—Swan Samson, Samson Hotel, has announced that party of local capitalists will spend $500,000 in building a street car line from Eleventh and A streets to Brown's Point, seven miles along the shores of Puget Sound.

TACOMA.—The Great Northern Railway Co. has given out plans for building two and one-half miles of snowsheds near Wellington at a cost of $1,500,000, and also of the installation of block systems between Everett and Bellingham.

TACOMA.—The Northern Pacific car shops

here have just received an order for 500 flat cars at approximate cost of $1,000 each. Work will be rushed and cars will be finished by September 1. The shops just completed a $1,000,000 order for rolling stock.

VANCOUVER.—The Clarke County Iron Works has completed extensive improvements to its plant.

WENATCHEE.—Contract for Great Northern tunnel through Cascade mountains, 1,290 feet long, has been let to Grant Smith & Co., Seattle, for $225,000.

WENATCHEE.—The Central Washington Gas Co. has been incorporated for $100,000. Arthur Gunn and J. H. Stout are principal owners. Company will furnish gas in this city.

WEST VIRGINIA

WEIRTON.—The Weirton Plate, Structural & Construction Co., capitalized at $25,000, with Alfred Tompkins, Pittsburgh, as president, and C. B. Chaney, Pittsburgh, secretary and treasurer, plans a new plant at Weirton. The main building will be 200 x 400 feet. The company will manufacture heavy furnaces, gas producers and tin house stacks.

WISCONSIN

APPLETON.—F. A. Gahring and J. C. Martin, Minneapolis, are negotiating for the lease of the Globe Iron Works, at Appleton, wherein to establish a plant for the manufacture of automobile accessories.

EAU CLAIRE.—The Tanberg Auto Co. has established a welding and cutting shop in connection with its machine shop and garage and will do work for the general trade. Jacob Gietz is foreman of the new department.

GRAND RAPIDS.—The Kimberly-Clark Co. has awarded contracts for the enlargement of its power plant at Niagara, Wis., to the Foster Construction Co., of Milwaukee. Considerable power equipment will be required upon the completion of the structural work.

GREEN LAKE.—The Green Lake common council granted a franchise to J. K. Stewart, Ripon, Wis., to supply electric current for light and power in Green Lake, and a contract to furnish the municipality with electric light. The source will be the Ripon Water & Light Co. plant at Ripon. A transmission line and transformer station will be constructed.

KENOSHA.—The M. A. Z. Concealed Hinge Co. has been incorporated to manufacture hinges, etc.; $10,000; by Edward Anderson, H. M. Fink and J. P. Zens, all of Kenosha.

KENOSHA.—The board of water commissioners is investigating the problem of purifying the water supply and may build a filtration plant at a cost of $30,000. Immediate relief is being secured by chlorination. J. F. Brennan is superintendent of the waterworks department.

KILBOURN. — The Southern Wisconsin Power Co. will build a high voltage transmission line from Kilbourn to Portage, via Sauk City, Prairie du Sac and Baraboo. Arrangements will be made for supplying each of these cities with current for light and power purposes. The Southern Wisconsin now transmits power from Kilbourn to Milwaukee in behalf of the Milwaukee Electric Railway & Light Co.

LA CROSSE.—The La Crosse Gas & Electric Co. will spend $150,000 in improving its gas works and distributing system this year. The capacity of the gas works and tanks will be doubled at an expense of $125,000, the remainder of the appropriation going for new mains, service pipes, and by-product plant. Thurston Owens is general manager.

LA CROSSE.—The La Crosse Industrial Association has purchased a tract of about 70 acres, along Black river and situated on two trunk lines, as factory sites for new industries. The first parcel has been selected for the Hans Motor Equipment Co., formerly the National Gauge & Register Co., of Minneapolis, Minn., which moved to La Crosse a year ago and will now build a plant costing $25,000. Edmund E. Hans, president and general manager, is now purchasing equipment, including milling machines, lathes, etc. The company manufactures pumps, gauges, tubes, fillers and other parts and accessories for the automobile trade, dealing with car manufacturers direct.

MERRILL.—The Merrill Iron Works is completing improvements begun Dec. 1, which will result in material changes in the operations. The company has discontinued its automobile department, which served motorists in a large territory surrounding Merrill, and has devoted this space to its general shops. The machine shop has been enlarged and the entire group of buildings overhauled and placed in first class condition. The improvements increase the capacity to a considerable extent and mean that the concern will henceforth devote its entire time to the manufacture and marketing of its own products.

MILWAUKEE.—The Brodesser Mfg. Co. has been incorporated to manufacture passenger and freight elevators; $20,000; by H. Brodesser, Harry Loulen and Peter Brodesser, all of Milwaukee.

MILWAUKEE. — The Milwaukee-Western Fuel Co. has been granted a permit to build a steel derrick, or "dock" with 300-foot span, of the twin type, at its canal yard at Sixteenth and Canal streets.

MILWAUKEE.—The contract for all power equipment, wiring, piping, etc., in the new central heating plant of the Milwaukee County Asylum for Chronic Insane at Wauwatosa was awarded to the Langstadt & Meyer Construction Co., Appleton, Wis., at $10,000.

MILWAUKEE.—The department of public works closes bids May 19 for furnishing, f. o. b. Florida-Clinton yard, the following material for the municipal water works department: 125 6-inch, 30 8-inch, 20 12-inch and 4 16-inch standard valves; 50 4-inch, 6 6-inch special valves. F. G. Simmons is commissioner of public works.

MILWAUKEE.—The department of public works will soon call for bids for a 12,000,000-gallon pumping engine for the municipal water works department, now that contracts have been awarded for the construction of an addition to the North Point pumping station. Estimated cost is $75,000. F. G. Simmons is commissioner of public works. (Previously noted).

MILWAUKEE.—The Milwaukee Motor Co., Thirty-second and Burleigh streets, Milwaukee, manufacturing automobile motors for the trade, has increased its capital stock from $250,000 to $300,000. The company is engaged in making additions and extensions and the additional issue will cover part of the cost. The capacity of the works is being increased about 35 per cent.

MILWAUKEE.—The National Brake & Electric Co., Milwaukee, is making rapid progress with the contruction of its new gray iron foundry, and the first heat will probably be taken off in July. The new shop is one of the largest in the Milwaukee district, and includes a main molding floor 100 x 240 feet. The plant will have a daily capacity of 75 tons and will be completely equipped with molding machines, and handling apparatus and other appliances for the economical production of castings.

MILWAUKEE.—The Geo. J. Meyer Mfg. Co., boilers and machinery, 576-586 Clinton street, has started work on a three-story addition, 140 x 150 feet, on Clinton street, near Lapham. The building will be devoted to the machine shops, and part of the structure, it is planned, will be leased to some concern which can use the space advantageously. The Meyer company was organized nine years ago to succeed the Davis Bros. Boiler Works, then occupying a small shop on Clinton street, between Orchard and Lapham streets. The present shops now consist of three buildings, 450 x 450 feet in size, which are now being increased in area by 140 x 150 feet.

MONROE.—The Invincible Metal Furniture Co. has been incorporated to manufacture metal furniture, vaults, safes, etc.; $20,000; by I. M. Stauffacher, A. L. Noel and Chas. E. Miller, all of Monroe.

NEW RICHMOND.—The capitalists at New Richmond and Minneapolis, Minn., are organizing a concern to be known as the Universal Petroleum Power & Heating Co., to develop and invention of E. J. Bell, of New Richmond, which makes possible the utilization of kerosene as fuel for internal combustion engines and illuminant for street lamps, as well as many other purposes. The company will be capitalized at $500,000. C. W. Arnquist, of New Richmond, will be president.

OSHKOSH.—The industrial committee of the Oshkosh Chamber of Commerce is looking over the field with a view to promoting the organization of a company to conduct a malleable iron foundry. George J. Smith, president of the chamber, is chairman of the committee.

RACINE.—The Chicago, Milwaukee & St. Paul Railway Co. will replace the steam locomotives operating "scoot" trains between Corliss, Wis., and Racine, with electric coaches. Corliss is the nearest point to Racine on the main line between Milwaukee and Chicago, and the Milwaukee road operates about ten trains per day on passenger and baggage business from the main line to Racine.

SHEBOYGAN.—The Optenberg Iron Works has recently booked contracts for several marine engines, among them a 100-horsepower machine for the government lighthouse tender Clover. The contract includes the boilers. The Clover formerly was the Two Myrtles, which was purchased by the government for the lighthouse service.

SHEBOYGAN.—F. Blocki & Co., manufacturing agricultural implements, have broken ground for several new buildings, the floor space in which will aggregate considerable more than the present plant. All of the buildings are of steel and brick construction, with the latest equipment. The location is at North Ninth street and Michigan avenue.

SHEBOYGAN.—The American Gas Engineering Co., recently incorporated for $50,000, as noted in THE IRON TRADE REVIEW, has broken ground for a factory group on South Fourteenth street, near Indiana avenue. There will be three buildings, of steel, brick and concrete construction, which will be devoted to general machine work, welding and cutting and repairing. E. M. Parmelee, D. D. Row-

lands and W. B. Lucas are the principal owners.

TWO RIVERS—The Standard Aluminum Co., manufacturer of aluminum products, advises that it is erecting a rolling mill, size 60 x 184, one-story. The equipment for the mill has been purchased.

WYOMING

CHEYENNE.—The Clear Creek Power Co. has been incorporated to do a general business in the generation, use, distribution and sale of electric, hydro-electric and other forms of power; $1,500,000; by F. W. Lowery, Elmer Sikes and J. B. Saunders.

MANVILLE.—The city council has commissioned its engineer, C. C. Carlisle, to prepare plans and specifications for a municipal water-works system and electric light plant.

DOMINION OF CANADA

ALBERTA

CALGARY.—Steam turbines and gas-fired boilers have been recommended to the city for future power extensions by R. A. Ross, acting general manager of the Toronto Hydro-Electric Co., in his report on Calgary power questions.

CALGARY.—Tenders will be received until May 31 by the Bowness Improvement Co. for the following machinery and equipment: Two alternating current generators; two direct connected exciters; one motor driven exciter set; one six-panel switch board; one series tungsten lighting system; tranmission lines and underground cable; two vertical multi-cylinder internal combustion engines. Specifications may be obtained from T. L. Turnbull, consulting engineer, Calgary.

LETHBRIDGE.—Messrs. Lees & Biglo, of Edmonton, have been awarded the contract for the International Harvester Co.'s warehouse here, at $125,000.

BRITISH COLUMBIA

NEW WESTMINSTER.—A new inspection barn at a cost of $28,000 will be built by the British Columbia Electric railway.

PORT EDWARD.—A water works system to cost $30,000 is being planned for Port Edward.

SALMON ARM.—By-laws were submitted to the ratepayers last week providing for the expenditure of $22,000 on an electric light and power plant, and $42,000 on a sewerage system.

VANCOUVER.—The city council is reported to have decided to extend the water-works system at a cost approximating $60,000.

MANITOBA

THE PAS.—Tenders will be received until May 20 by Secretary-treasurer H. H. Elliott, M. D., of The Pas, for the supply and delivery of two crude oil engines; two generators, exciters, switch and other apparatus; 4,400 feet 12-inch steel or cast iron pipe; 3,500 feet 10-inch, 4,400 feet of 8-inch and 2,000 feet of 6-inch steel or cast iron pipe with 50 specials; 30 hydrants, 52 gate valves and boxes; two pneumatic storage tanks.

WINNIPEG.—The city has accepted the tender of the Canadian Westinghouse Co. at $9,100 for the delivery and installation of six 500-kilowatt transformers for the civic light and power department. The price was more than $1,000 less than the next lowest tender.

ONTARIO

COBALT.—The town council will spend over $13,000 this year for the maintenance and improvement of the street lighting.

COBALT.—The Rose Van Cutseu syndicate, of London, Eng., recently secured control of the City of Cobalt Mining Co. and will build a mill capable of treating 150 tons of ore per day, and spend $100,000 on other improvements.

FORT WILLIAM.—The city council has awarded a contract to the Canadian Iron Corporation of Montreal for 7,000 feet of 18-inch cast iron pipe at a contract price of $25,000. The Canadian General Electric Co. will furnish a 500-kilowatt generator at a contract price of $11,000.

FORT WILLIAM.—The city is calling for tenders for three tunnels, one each under the Keministiquia, Mission and McKellar rivers, to carry water to Islands Nos. 1 and 2, where several new plants are to be situated. They will be 1,275, 677 and 629 feet in length, respectively. The tenders should be in the office of the city engineer by May 29. A. McNaughton, city clerk.

FORT WILLIAM.—Work involving large expenditures will be carried on in Fort William in 1913. Water front development will cost $20,000,000 and include besides the construction of additional slips, dredging, building of breakwaters, the provision of additional elevator capacity, additional freight and coal sheds for the Canadian Pacific and Grand Trunk Railways. R. R. Knight is city engineer.

HAMILTON.—The Hamilton Cadillac Motor Co., Ltd., has obtained a charter of incorporation to manufacture automobiles and other vehicles; $40,000; by James Dixon, Frank R. Newberry, James A. Sauriol and others.

LINDSAY.—The Lindsay Machine & Tool Co. has decided to locate here, and move its plant from Peterborough, Ont. P. H. F. Spies, manager, has secured the contract to manufacture special machinery for several concerns located in Lindsay. Another firm soon to commence operations here is the Canadian Boving Co., a Swedish firm doing an extensive business in hydraulic machinery in Canada. The company has secured a plant, and will install machinery, as well as make extensive additions. The head office is at present on Bay street, Toronto.

NORTH BAY.—The contract for constructing the new shops of the Canadian Pacific railway here has been awarded to Sherwood & Sherwood, contractors, who make their headquarters at North Bay, and have also the contract for an addition to the Sudbury station at a cost of $30,000. The C. P. R. will spend $350,000 on its new shops.

OTTAWA.—The contract for the pier being built by the Dominion government at Carleton Point, Prince Edward Island, has been awarded to the Halifax Dredging Co. for $709,495.

OTTAWA.—The completed section of the Transcontinental (Grand Trunk Pacific) railway from Moncton to Edmundston, N. B., is to be operated temporarily by the Intercolonial. F. H. Gutelius, the recently appointed general manager of government railways, has left for Moncton to arrange for the operation of the new line.

OTTAWA.—A branch line will be built by the Canadian Pacific railway from a point near Bolton, Ont., through Peel and Halton counties to a point near Campbellville on the Ontario & Quebec railway. Several other branch lines will also be built in the East.

PEMBROKE.—The Pembroke Transportation Co., Ltd., has been incorporated to build and own steamships for transportation purposes; $40,000; by William L. Hunter and James C. Hunter, John W. Smith and others, of Pembroke.

PORT ARTHUR.—Port Arthur will receive tenders until May 19 for three centrifugal pumps, specifications for which may be obtained from T. Aird Murray, of Toronto.

PORT ARTHUR.—The city council last week signed an agreement with the Connelly Frog & Switch Co. for the erection of a $100,000 plant on property recently purchased The company, of which John Connelly, of Memphis, Tenn., is the president, agrees to employ 50 men, and to begin the erection of its plant within 60 days, the product to be turned out within a year. The new company will manufacture all kinds of railway accessories, and to aid the city will make a loan of $25,000.

RENFREW.—The Renfrew Electric Mfg. Co., Ltd., has been incorporated to manufacture and deal in electrical machinery and act as machinist and foundrymen; $50,000; by Joseph Vaughn, Ernest Buck and John J. Osborne, of Ottawa, and others.

STRATFORD.—The town has agreed to lend the Stratford Milling Building Co. $30,000 and grant other concessions, for which the company will erect a $60,000 plant for the manufacture of flour mill machinery, and employ 100 hands within three years. The old plant was destroyed by fire last fall.

TORONTO.—The Toronto Board of Control has awarded contracts for wire and cable at $21,058 to the Canada Wire & Cable Co., Toronto.

TORONTO.—The Ore Chimney Co., of Northern Frontenac, Ont., has removed its main office from Buffalo to Clyde Blocks, Hamilton, Ont. The shaft will be continued from the 125 to the 300-foot level, and a 300-ton concentrating plant erected.

TORONTO.—The civic abattoir under construction by Wickett Bros. cannot be completed until next spring on account of a shortage in steel. The steel companies have so many orders ahead that the contractors cannot secure deliveries.

TORONTO. — Macdonald-Meerbeck, Ltd., has been incorporated, capitalized at $40,000, to manufacture automobiles and accessories and carry on business as machinists. August Meerbeck, Frank E. Macdonald and Francis H. C. Macdonald are provisional directors.

TORONTO.—The Standard Concrete Equipment & Cast House Co., of Canada, Ltd. has been incorporated to manufacture and deal in devices, steel molds, machinery, etc., and to carry on a construction business; $150,000; by Frank J. Foley, George F. Rooney, Daniel J. Coffey and others, of Toronto.

TORONTO.—The Canadian Pacific Railway

has commenced the work of double-tracking the line from North Toronto to Agincourt Junction, a distance of eight miles. The work includes the erection of four additional bridges in York township. Two of the spans are each nearly 1,000 feet long. The bridge work will cost at least $400,000, and the steel required for the bridges will be ready by fall.

WESTON.—The Moffatt Stove Co. will erect a $25,000 addition to its present plant on Dennison avenue, consisting of a three-story molding shop, and a nickel plating shop. M. H. Lever, of Mount Denis, Ont., has been awarded the contract for the work.

QUEBEC

MONTREAL.—Dietrich, Ltd., has been incorporated to acquire as a going concern the electrical appliance business carried on under the name of W. N. Dietrich in Montreal. It is capitalized at $50,000.

MONTREAL.—Contractors' Supplies, Ltd., has been incorporated to manufacture and deal in iron, steel rails, machinery and tools, contractors' supplies, etc.; $30,000; by Robert Wall, Milan Putnick and Auguste Dufres, all of Montreal.

MONTREAL.—The Fred Thomson Co., Ltd., has been incorporated to manufacture and deal in electrical machinery and supplies; $100,000; by Francis J. Laverty, K. C., Charles A. Hale and James Dunlop Jr., all of Montreal, and others.

MONTREAL.—The Electric Repair & Contracting Co., Ltd., has been incorporated to manufacture, buy and sell electrical and automobile appliances; $50,000; by George E. Matthews, of Westmount; Robert Urquhart, of Montreal, and others.

MONTREAL.—Lavoie Motor, Ltd., has been incorporated to manufacture, buy and sell motors and engines, autos, trucks, aeroplanes, etc.; $1,000,000; by Alphonse J. Lavoie, Howard S. Ross, Oswald F. Shearer, and others, of Montreal.

MONTREAL.—The American Light, Heat & Power Co., of Canada, Ltd., has been incorporated to manufacture and deal in appliances for the employment of gas, electricity and other illuminants; $150,000; by Charles Bruchesi, Joseph A. Marion, Armand P. Raymond, of Montreal, and others.

MONTREAL.—With applications already in for $450,000 of the bonds and $405,000 of the common stock, subscription lists were last week opened for an offering of $770,500 six per cent bonds and $4,000,000 common stock of the Phoenix Bridge & Iron Works, a company organized to take over the business of the company by the same name. The refinancing is being done, according to President James W. Pyke, to provide for extensions to the plant.

MONTREAL.—The Canadian Pacific railway turned out of the Angus shops for the week ended May 1 as follows: One sleeper, two suburban, 12 baggage and express and three box baggage cars. From other sources the Canadian Pacific has also received: Canada Car & Foundry Co., two tourist cars, 157 box cars, 95 flat cars; National Steel Car Co., 68 box cars; Novia Scotia Car Co., 18 box cars; Western Wheel Scraper Co., five air dump cars; Hopkins & Co., four ballast ploughs, one ballast spreader; Pullman Co., five sleepers; Allis-Chalmers-Bullock, one Lidgerwood unloader; Montreal Locomotive Works, one G2 class locomotive; Agus shops, three G2 class locomotives. During the month of April the following rolling stock was built at Angus shops: Eight sleepers, 13 suburban, 10 tourist, 17 baggage and express, three box baggage, 13 horse cars.

QUEBEC.—The Stratford Copper Mines Co., Ltd., has been incorporated to mine copper, nickel, lead, coal and iron, etc.; $200,000; by Elderic Allard, Alphonse Bureau, of Courcelles, Que., and Philippe Roy, of Quebec.

ST. JOHNS.—The St. Johns & St. Lawrence Co., Ltd., has been incorporated to carry on steam, electric and gasoline transportation on land and water; $20,000; by Euclide Langlois, Jacques Cartier and Joseph C. Harbeck of St. Jean, Que.

SASKATCHEWAN

ESTEVAN.—The Dominion Odic Co., capitalized at $1,000,000, has agreed to erect a plant to cost $50,000 for the manufacture of electric motors.

MELVILLE.—The Royal Farm Machinery Co., Ltd., whose specialty is the Abengeller cutter bar for mowing and reaping machines, has decided to establish its Canadian plant here, work on the building to commence immediately. The company expects to be turning out machines by the fall. A distributing warehouse will be erected at Winnipeg, where the chief office will be situated. J. S. Hough, of Winnipeg, is a director and secretary-treasurer of the company.

REGINA.—The Dominion government has decided to dredge the Qu' Appelle river in the vicinity of Fort Qu' Appelle and to construct three dams which will considerably increase transportation facilities.

REGINA.—The Grand Trunk Pacific Railway Co. has awarded the contract to construct a million dollar hotel in this city to Lyall-Mitchell, contractors.

SASKATOON. — The city will spend $2,000,000 in improving and extending its public utilities. Street car extension will be made, including one to Sutherland costing $70,000. Outside of this line, $100,000 has been voted for street railways. Over $250,000 will be spent on extensions to sewer and water systems. On electrical development $200,000 will be spent, including additions and alterations to the power house, and the installation of a 3,000-kilowatt generator, and additional arc lights. Pumps to be purchased include a 2,000,000 gallon pump, and two booster pumps to be used in case of fire.

STRASSBURG.—Tenders may be forwarded to S. L. A. Smyth, secretary treasurer of Strassburg, until May 20, for the erection of an electric light plant.

TRADE NOTES

BOSTON, MASS.—The Guy S. Leavitt Co., dealer in steel and iron, 241 Albany street, Cambridge, with offices at 70 Kilby street, Boston, has filed a voluntary petition in bankruptcy. The firm's liabilities are given as $60,196.45 and assets, $51,766.59.

BUFFALO.—The Acme Steel & Malleable Iron Works, 245 Military Road, Buffalo, finds difficulty keeping up with business this spring, labor scarcity handicapping the plant. A wage increase of 10 per cent recently did not serve to better conditions.

BETTENDORF, IA.—The name of the Bettendorf Axle Co. has been changed to the Bettendorf Co.

CANAL DOVER, O.—The Valley Foundry Co. has filed a voluntary petition of bankruptcy in the federal courts in Cleveland. The company was organized two years ago and made a specialty of iron castings for repairing machinery.

CHICAGO.—The International Molding Machine Co. is moving its offices and works from 2300 S. Western avenue to 2614 W. Sixteenth street, Chicago. The change of location has been made necessary by increased business, demanding improved facilities.

COBOURG, ONT.—The court has issued a winding-up order against the Provincial Steel Co. and G. T. Clarkson, of Toronto, has been appointed liquidator. The company has an authorized capital of $250,000, of which $230,000 is stated to be paid up. The liabilities are given at $227,674, and it is claimed that the assets exceed this amount by $125,558.

COLUMBUS, O.—J. D. Price has been named receiver for the defunct Columbus Malleable Castings Co. Liabilities of the company total $74,820.

DALLAS, TEX.—The Southern Steel Products Co., Dallas, has filed an application for permission to dissolve.

DALLAS, TEX.—The Southern Iron & Steel Co., of Texas, has changed its name to the Standard Steel Co. of Texas.

DETROIT.—The Detroit Trust Co., receiver for the New Process Steel Co., sold the Marshall, Mich., plant of the company May 14.

DOUGLASSVILLE, PA.—The old rolling mill of the Douglassville Iron Co. has been sold. It is to be used for a screw works.

LOWELLVILLE, O.—The Ohio Iron & Steel Co. plans a $12,000 club house for its employes. The building will be two stories, the first floor to be used for club rooms and the second for an assembly hall.

NEW YORK CITY.—The J. M. Voith Co., Inc., has been incorporated to sell in the United States and Canada the water wheels, governors, pulp and paper machinery manufactured by the J. M. Voith Engineering Works at Heidenheim-Brenz, Germany, and St. Poelton, Austria. Arrangements also have been made with machine shops in this country to manufacture machinery and repair pieces according to J. M. Voith's designs. H. F. Storrer, C. E., 200 Fifth avenue, New York City, will be in charge of the business.

SYRACUSE, N. Y.—Manufacturers representing nearly every industry in Syracuse, have organized the Manufacturers' Association of Syracuse. Carleton A. Chase is president of the association.